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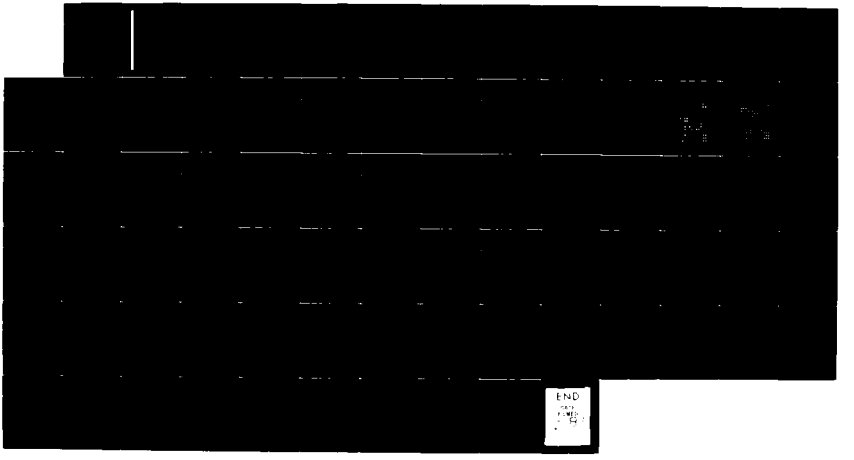

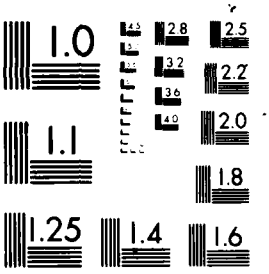

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CSE REPORT 27

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THE RAAF LOGISTICS STUDY (VOLUME 4)

BY

R. WATSON
R. SMITH
SQNLDR G. VOUMARD
M. JARVIS
P. CLARK

Department of Defence

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THE RAAF LOGISTICS STUDY

(VOLUME 4)

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SUMMARY

This Volume is one of a companion set of four comprising CSE Report 27 which records the work carried out by Central Studies Establishment for the Chief of Supply and Support and endorsed by the Chief of the Air Staff. This particular Volume provides an overview of the study, and discusses possible directions for future work.

POSTAL ADDRESS: Superintendent Analytical Studies
Department of Defence, Canberra, ACT 2600

PREFACE

The RAAF Logistics System is a very complex human activity system which has been analysed by the Central Studies Establishment on behalf of the Defence Logistics Organisation. This work, now reported on, stems from a conviction that improved decision making can flow from an enhanced and integrated understanding of the activities necessary to fulfil the objectives of the system, by those involved in it or affected by it.

This Report, in four volumes, has been prepared in fulfilment of the requirements for Phase 1 of the CS&S RAAF Logistics Study and provides within the framework of the Soft Systems Methodology, a highly structured and conceptual description of the RAAF Logistics System.

Its purpose is not merely to review the RAAF Logistics System and to generate recommendations for improvement. In so doing it would simply be repeating the work of others. Rather, it is to provide a framework for RAAF managers and others, for comparison between the conceptual models of the RAAF Logistics System and the real world so that desirable and feasible changes in the system may be identified and implemented.

The Report is unlike any previous publication on the RAAF Logistics System, and will demand a great deal of dedicated effort on the part of RAAF officers and managers for its reading, study and appreciation.

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SECTION 6

THE RAAF LOGISTICS SYSTEM STUDY
OVERVIEW, OBSERVATIONS AND OUTLOOK

INTRODUCTION

1. The model of RAAF logistics activities described in the preceding five sections of this report is presented in fulfillment of Phase One of the RAAF Logistics System study, for which Terms of Reference were approved in March 1983.

2. As stated in the Terms of Reference (see Annex A, Paragraph 6), Phase One was to provide:

a. a description of the logistics environment; and

b. a description of the logistics system at all organisational levels.

The logistics environment as a whole has been reviewed at Section 2, Chapter 1 of the report, whilst the two major sub-systems of the RAAF logistics environment (i.e. the RAAF Operational system and the RAAF Financial system) have been modelled and described at Section 2, Chapter 2 and Section 3, respectively. For the purposes of the study, the RAAF Logistics system itself has been studied at the level of two component systems, termed Supply and Technical. Models of these systems have been presented at Sections 4 and 5 respectively. As required by the Terms of Reference, the models of the Supply and Technical systems developed are concerned with the in-service phase of equipment life, although some aspects of the Major Equipment Acquisition (MEA) process are also discussed, inasmuch as such activities influence the in-service phase.

3. The objectives set for this, the concluding section of the report, are as follows:

a. to provide the reader with general guidance as to the means of approaching the present report, and in particular guidance as to the use of the model as a component in the development subsequently of feasible and desirable changes to the system (Paragraphs 4 to 13 below);

b. to provide the reader with some specific guidance as to the structure of the Supply and Technical system models, highlighting particular systemic attributes identified (Paragraphs 14 to 38);

c. to describe how the separate Supply and Technical system models reported might be viewed as components of a higher level RAAF Logistics system model (Paragraphs 39 to 45);

d. to discuss a number of problem areas identified in the course of the study, casting these problems in the framework of the system model developed (Paragraphs 46 to 59);

e. to mention also, several problem areas which, although beyond the study terms of reference, and consequently not able to be cast directly in the framework of the system model developed, are deemed worthy of comment (Paragraphs 60 to 62); and

f. to canvass two possible directions for future study (Paragraphs 63 to 76).

THE NATURE AND USE OF SOFT SYSTEMS MODELS

Development of Conceptual Models

4. The methodology underlying the development of the models reported in the present study is that referred to in systems analysis literature as 'soft' systems. In its general form it is described in 'Systems Thinking - Systems Practice' by P.B. Checkland (Wiley, Chichester, 1981), although the variant of the soft systems approach found to be most useful in the description of RAAF logistics activities is more closely aligned to that described by B. Wilson in 'The Design and Improvement of Management Control Systems', Journal of Applied Systems Analysis, Volume 6, 1979, pages 51 to 67.

5. The soft systems methodology was developed to tackle problems in organisations which cannot be formulated as a search for an efficient means of achieving a defined end, or in which ends, goals and purposes are in themselves problematical. The methodology entails the formulation of a 'root definition' of the system (i.e. a short statement expressing the basic purpose of the system from a particular point of view). Conceptual models of the organisation are then developed, where these models express the sequence of activities required for the purpose expressed in the root definition to be achieved. These conceptual models are built by structuring the various operations of the organisation into a collection of 'human activity systems' (where by this is meant a notional system which expresses purposeful human activity). Each of these human activity systems can then be regarded as a system in its own right, and through the mechanism of a root definition can be further developed to conceptual models at a higher level of detail or resolution. The result of this approach is a model of the system as a hierarchy of systems derived from the first root definition. The complete model will be expressed as a set of activities, together with the information and resource flows needed if those activities are to be carried out effectively.

6. In the present work a variant of the approach, due to Wilson (see Paragraph 4 above), has been used. The reason this has been done is that the Terms of Reference made it clear that a model which described the existing system was required. Further, it was the perception of the authors, that for any models of the existing system to be of value to the RAAF, they should not become so abstract that it would be unreasonably difficult to map existing RAAF activity onto the human activity systems which occur in the model. The approach taken, therefore, has been one of iterative

comparison of models with the 'real world' RAAF activities and modification of models to reflect more closely activities observed. The result of this is that the Supply and Technical system models can be seen as models of the real world; however they emphasise what is done (i.e. the purposes underlying certain functions) whilst the real world is one particular example of how it is done (this distinction is described further at Section 1, Paragraph 18, of this report). In this sense then, the models produced provide a deeper view of RAAF logistics activity than might first seem the case.

7. It should be understood that the methodology described above represents a fundamental paradigm shift. Traditional systems engineering methodologies are based upon the paradigm of 'optimisation' whereas the soft systems methodology takes the paradigm to be one of 'learning'. It is argued that in the development of conceptual models of the system, as described above, and in particular in the analysis which should ensue as managers working within the system debate the models which emerge, a 'learning' process takes place which will lead to the proposal of feasible and desirable changes to the system under study, or just better decision taking resulting from a better understanding of the whole system rather than just particular parts of it.

8. Some techniques which might be adopted by RAAF managers wishing to use the models of RAAF logistics activity developed by CSE, as a means of orchestrating a debate along the lines discussed above, will be presented shortly (Paragraphs 10 to 13 below). Firstly, however, a note of caution. As pointed out by Wilson in his book 'Systems: Concepts, Methodologies and Applications' (Wiley, Chichester, 1984, page 255), this process of 'learning' can be one of the most rewarding, and yet most difficult, of all intellectual processes. To quote:

> 'One component of this difficulty is related to time. Time is needed for the necessary reflection on experience. One cannot know, at the time that learning is occurring, what it is that is being learnt.
>
> A second component is related to the language of description. If such learning is to be made explicit so that it can be communicated (even to oneself), then a language must be available in order to describe what has been learnt. This may turn out to be a major hurdle, since the appropriate language is dependent on what is to be described and 'what is to be described' is not known because the appropriate language is not available or understood. Some people may have difficulty in emerging from this closed system and hence may never know what they know (or don't know).
>
> The third component is related to the opportunity for critical debate. Assuming that time is available for reflection upon the experience that is accumulating, and assuming that a language is available for describing what has been learnt, without the opportunity for debating the outcome with a critical audience (i.e. seeking refutation) such learning may be superficial.'

9. What has been offered as a result of the present study by CSE is a detailed, well-structured model of RAAF in-service technical logistics activities, as required by the Terms of Reference, which satisfies the second of the three components listed by Wilson above (i.e. a language of description). This model provides a language for critical debate directed towards the development of feasible and desirable changes to the system, or just the taking of better decisions.

Use of Conceptual Models

10. It would be useful to provide guidance as to the means by which the conceptual models developed by CSE might be approached if the critical debate advocated by the soft systems approach is to be undertaken. Wilson, in 'Systems: Concepts, Methodologies and Applications' pages 75 to 85, recommends four methods of comparison of the conceptual models developed with the real world:

a. general discussion;

b. question generation;

c. (historical) reconstruction; and

d. model overlay.

Whilst all four methods might have something to offer in the present context, it is argued that the first two are the most appropriate.

11. The first method of comparison is concerned with a general discussion about the nature of the models, and any organisation implied by them, which is to be compared with the nature of what is believed to exist. This approach, which Wilson illustrates by means of case studies, will tend to highlight strategic issues in relation to role and to the existence of certain activities, rather than issues at a detailed procedural level.

12. The second method of comparison, question generation, has been formalised by Wilson in terms of a systematic questioning of the existence, mechanism and performance of activities in the real world which might be identified with activities specified in the conceptual model. In principle, the first part of this procedure has been completed by CSE. The text describing each activity within the conceptual model of the RAAF Logistics system has identified and described mechanisms within the present RAAF organisation which can be mapped onto the purposes expressed by the elements of the model. The procedure described by Wilson which should then follow requires that measures or criteria be proposed for the evaluation of the effectiveness and efficiency of the real world activities under consideration in fulfilling that purpose. From this can emerge incremental changes to improve the situation.

13. It is emphasised in all writings on the use of the soft systems approach, that for the types of methods suggested above to yield feasible and desirable directions for change it is essential that relevant management have substantial involvement in the interpretation of, and debate about, the proposed models. Without such involvement, the learning which emerges from the modelling may well be superficial.

SYSTEMIC ATTRIBUTES OF MODELS OF THE RAAF SUPPLY AND TECHNICAL SYSTEMS

14. It is appreciated that the length and complexity of the model description might make it difficult for the manager concerned with a particular aspect of Logistics system operation to locate those parts of the model particularly relevant to his concern. In view of this, the intent of the following is to provide an overview of the model, highlighting particular systemic attributes, by reference to relevant sections of the report. However, as will be obvious, such a brief overview cannot in any sense encompass the wide diversity of activity covered in the full model description.

Hierarchical Structure

15. The hierarchical structure of the Supply (S) and Technical (T) system models developed is displayed in Figures 6.1 and 6.2 respectively. In each case it has been deemed useful to introduce, at the first level of resolution, the 'formal system' model concept (see Section 1, Paragraph 21) that a system can be viewed as an operations system (S1/T1) concerned with the transformation of resources into products, and a planning and control system (S2/T2), concerned with the definition of overall system objectives/plans/performance measures, the monitoring of overall system performance and the taking of corrective action. The introduction of such a formal system concept, places the model naturally into a framework in which the conversion of requirements into programmes and the analysis of programme effectiveness and cost resides within the Planning and Control systems, whilst resource acquisition, the execution of programmes and expenditure of resources reside within the Operations systems. As shown in Figures 6.1 and 6.2, it has been found useful to further resolve the planning and control functions in terms of Operational Planning and Control (S2.1/T2.1) systems, which define objectives/plans/performance measures governing the Supply and Technical Operations (S1/T1) systems, and Financial Planning and Control (S2.2/T2.2) systems, which are concerned with the planning and control of financial dealings within the Supply and Technical systems.

16. As also displayed in Figures 6.1 and 6.2, the Supply Operations (S1) and Technical Operations (T1) systems have been modelled at the second level of resolution to include four sub-systems each (i.e. S1.1, S1.2, S1.3, S1.4 and T1.1, T1.2, T1.3, T1.4). In turn, these systems have been developed to higher levels of resolution as shown.

17. It should be noted that the Supply and Technical system models have actually been developed to one further level of resolution beyond that shown in Figures 6.1 and 6.2. The functional elements identified in this last level of development are listed at Tables 6.1 (pages 31 to 38) and 6.2 (pages 39 to 57), and will now be described.

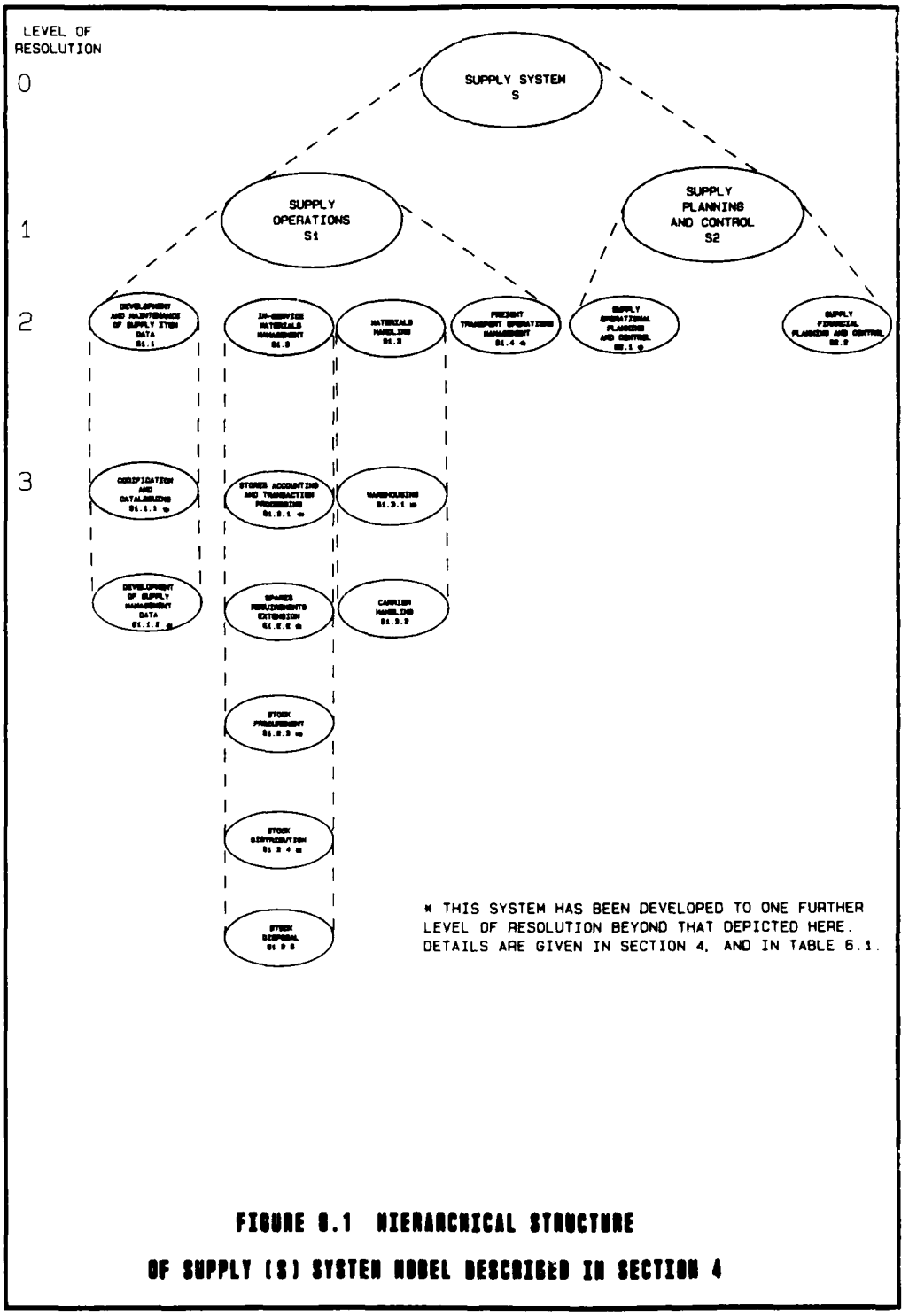


FIGURE 6.1 HIERARCHICAL STRUCTURE OF SUPPLY (S) SYSTEM MODEL DESCRIBED IN SECTION 4

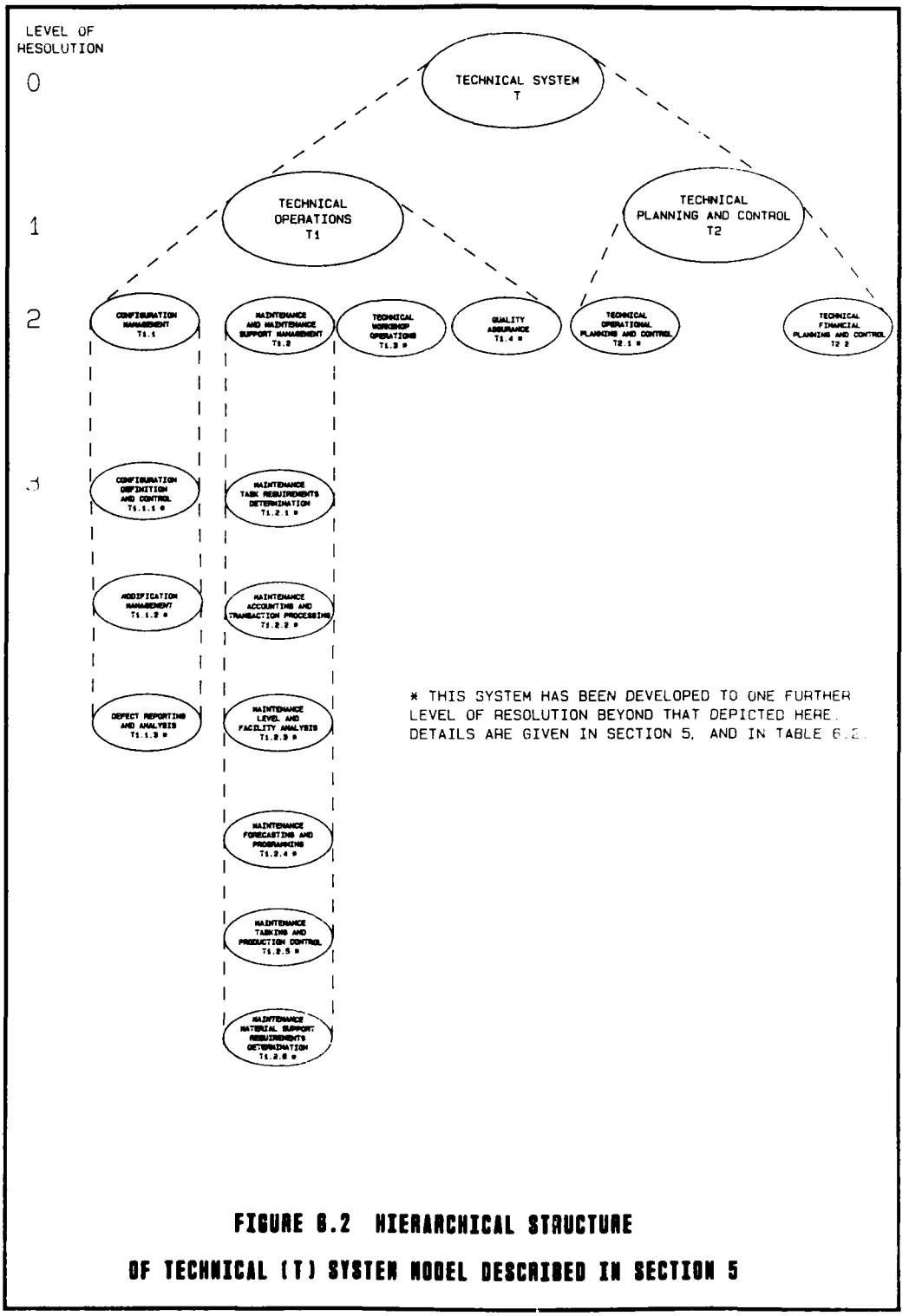


FIGURE 6.2 HIERARCHICAL STRUCTURE OF TECHNICAL (T) SYSTEM MODEL DESCRIBED IN SECTION 5

Functions and Processes

18. The notions of functions and processes have been taken in the present model to have the following meanings. Function has been used in the context of 'functional systems' and 'functional elements'. A functional system (which, for the purposes of this study, is identified with the notion of a 'human activity system' as described at Paragraph 5 above), is a set of interconnected activities with the property that those activities taken together either transform some defined input(s) into some defined output(s), or they carry out the planning or control actions required for the effective and efficient completion of that transformation, in a form consistent with environmental influences and constraints. In the present model, the hierarchy of systems shown in Figures 6.1 and 6.2 represents a structuring of the functions carried out within the RAAF in-service technical logistics organisation. At the most detailed level of this hierarchy (i.e. the highest level of resolution), entities have been found which, from the analyst's point of view, are not systems at all but only system components. These entities are termed functional elements. Each of the highest resolution level systems identified in Figures 6.1 and 6.2, has been examined in further detail at Tables 6.1 and 6.2, respectively. Specifically, reference has been given, for each system, to the portion of the report at which detailed description is given. Furthermore, in the second column of the Tables are listed the functional elements distinguished within each of those systems.

19. The term process in this report has been used to mean a sequence of real world activities, within a conceptually defined function, which represents a particular way in which the function is carried out. The notion of process can be illustrated by the use of the following examples. In the model developed for the Supply system it has been necessary, in the case of the Development of Supply Management Data (S1.1.2), Spares Requirements Extension (S1.2.2), Stock Procurement (S1.2.3) and Stock Distribution (S1.2.4) functional systems, to distinguish a number of different ways in which the function has been carried out. For example, in the case of the Stock Procurement system, the various ways identified as most relevant to technical equipment are the Direct Local Procurement, Indirect Local Procurement, Overseas Commercial Procurement, and Foreign Miliary Sales Procurement Processes. One might also further distinguish on the basis of whether the process is conducted at Central, Stores Depot or Unit level. To make the model developed more explicit, it has been decided in such cases to select one of these processes, and to develop the model of the functional system to represent that process. This has then been followed by comment in text on the modifications necessary to that basic model if it is to be applied to the other processes identified. In Table 6.1, for example, it will be seen that for the S1.1.2 system the Material Demand/Issue Controls Data Development Process has been studied in detail; for S1.2.2, the Central Provisioning Process; for S1.2.3, the Central Direct Local Procurement Process; and for S1.2.4, the Wholesale-Retail Resupply Process.

20. A similar approach has been taken in the Technical system model as shown at Table 6.2. In this case, the primary discriminating factor has been the Maintenance Facility Level involved (i.e. Operating, Intermediate or Depot).

Information Transfers

21. The notion of information transfer is well understood. Information includes that data, in whatever format, either required by a functional system to achieve its purpose or produced by that functional system. In Tables 6.1 and 6.2, the major types of information input to, or output from, each of the systems have been listed. It should be noted that the information types listed are intended only to give the general nature of the inputs and outputs involved. Reference to the detailed descriptions of systems within the report will provide a breakdown of each information type and of the formats used for the information transfer. Also listed in the Tables are the sources/destinations of the information input/output types listed.

Resource Types and Flows

22. It has been found convenient to distinguish two resource types in the present study, i.e.:

a. materials or resources excluding money (e.g. spare parts, aircraft, transport services, flying hours, contractor maintenance services); and

b. money, or more correctly the responsibility for its expenditure.

Resource flows identified in the model are recorded in Tables 6.1 and 6.2 under the input and output headings, by appending the word 'resource' after the description of type.

23. Tables 6.1 and 6.2 include only inputs to, and outputs from, the systems as a whole. The detailed models available at the references given in the Tables include also the information and resource types and flows between the functional elements which make up each system.

Decision Mechanisms

24. The major decisions identified in the course of the present study are listed at column 7 of Tables 6.1 and 6.2. Decision mechanisms are described in detail at the references given, in terms of the information requirements to support the decisions, the criteria applied to take decisions and the administrative procedures used.

Trade-off Relationships

25. Trade-offs are defined as those different mixes of inputs (resources or policies) within or between the different logistics sub-systems, which may achieve the same total system output or level of effectiveness.

26. Major trade-offs identified in the present study are listed at column 8 of Tables 6.1 and 6.2. The majority of the identified trade-offs might be grouped according to their association with:

a. Engineering Activity (i.e. trade-offs associated with activities described in the Configuration Management (T1.1) system). These involve a trade-off of the benefits of improvement in component performance, including consequent reduction in spare part consumption/repair activity, against the cost associated with the engineering improvements;

b. Maintenance Activity (i.e. trade-offs associated with activities described in the Maintenance and Maintenance Support Management (T1.2) system). These involve a trade-off between the benefits of various maintenance tasks, intervals, facilities and support equipment, in accord with specified budget allocations; and

c. Inventory Activity (i.e. trade-offs associated with activities in the Maintenance Material Support Requirements Determination (T1.2.6), Operational Planning and Control (S2.1/T2.1) and Spares Requirements Extension (S1.2.2) systems). These involve a trade-off between the investment in inventory and the equipment availability level required.

More detailed descriptions of these are given at the references listed in the Tables, including discussion of the means employed for the taking of trade-off decisions and, where possible, reference to texts or other sources which discuss relevant techniques for taking resource allocation or policy decisions.

Environmental Interfaces

27. The logistics environment as a whole has been reviewed at Section 2, Chapter 1 of the report, whilst the two major sub-systems of the RAAF logistics environment (i.e. the RAAF Operational system and the RAAF Financial system) have been modelled and described at Section 2, Chapter 2 and Section 3 respectively.

28. Specifically, the RAAF Operational (OP) system model has described the characteristics and requirements of air operations at the model of the RAAF Operations (OP1) system (Section 2, Paragraphs 41 to 52), and the means by which an operational concept and activity levels are determined at the models of the Resource Planning (OP2), Operational Rate Planning (OP3) and Operational Profile Development (OP7) systems (Section 2, Paragraphs 53 to 64, 65 to 74 and 107 to 114). Major equipment acquisition activities, which have an influence upon subsequent activity within the In-Service Technical Logistics system described in this report, are discussed at the Capability Requirements Determination (OP5) and Equipment Requirement Identification (OP6) systems (Section 2, Paragraphs 85 to 93 and 94 to 106). The operational requirement

evolves and is recorded as a functional baseline by the OP5 system, whilst the OP6 system is concerned with the hardening of specifications to form a production baseline. Specific points of interface between the RAAF Operational system and the Supply and Technical components of the in-service technical logistics model, can be identified from Tables 6.1 and 6.2 by examination of input/output types which have sources or destinations at the OP system.

29. The Supply and Technical Financial Planning and Control (S2.2/T2.2) systems referred to at Paragraph 15 above, have been seen as interface systems between the environmental RAAF Financial system described at Section 3, and the Supply and Technical system models described at Sections 4 and 5. Tables 6.1 and 6.2 may be consulted to determine points at which the Financial system interfaces with the Logistics system via the S2.2 and T2.2 systems.

30. Interfaces with other enviromental influences (e.g. external suppliers of equipment; external suppliers of transport services; external suppliers of technical data, technical services and maintenance manhours; Defence Central; NATO nations, other DCS users and other government departments; other users of equipment; and disposal authorities) identified within the study are also noted in Tables 6.1 and 6.2.

31. Finally, although it was suggested in the Terms of Reference that the maintenance and supply support concepts should be considered environmental to the Logistics system (see Annex A, Paragraph 9d and e), it has been deemed that the concepts involved are so important to an understanding of the logistics planning and control function that their description has been placed with the Supply and Technical Operational Planning and Control (S2.1/T2.1) system descriptions.

Control Mechanisms

32. Two broad levels of control have been identified in the present model. Control concerned with overall Supply/Technical system performance has been described at the S2 and T2 systems, respectively. References to the sections of the report describing these systems are given in Tables 6.1 and 6.2. Also described are control activities localised to particular sub-systems. These are concerned with the monitoring and control of activities in particular sub-systems of the Supply Operations (S1) and Technical Operations (T1) models. These more restricted levels of control can be recognised in Tables 6.1 and 6.2 by examination of the functional elements column (column 2), to locate elements which include words such as 'monitor', 'control' or 'refine' in their titles. For the remainder of the present discussion, the first of these two areas (i.e. control concerned with overall Supply/Technical system performance) will be discussed.

33. Detailed models of the Supply Operational Planning and Control (S2.1) and Technical Operational Planning and Control (T2.1) systems are given at Section 4, Paragraphs 30 to 69 and Section 5, Paragraphs 41 to 110, respectively. Each has been modelled in terms of a conceptual model with functional elements which are concerned

in turn with the definition of plans/performance measures/goals/objectives, with the definition of policies/parameters, with the measurement of performance data relevant to those objectives, with the evaluation of performance and, finally, with the taking of corrective action.

34. It has been found useful in developing these Planning and Control models to introduce the notions of programmed and unprogrammed activity (see R.N. Anthony, 'Planning and Control Systems - A Framework for Analysis' (Harvard University, Boston, 1965) pp. 70 to 76). Programmed activities are stable, repetitive activities in which the optimum input-output relationship is, in principle, capable of description and reduction to rules. Most of the activities of the Supply Operations system discussed in Section 4, have been classified as programmed. These are to be contrasted with unprogrammed activities, which are unique, judgemental activities in which the input-output relationship cannot be determined. Unprogrammed activities include research and development, engineering design, the work of staff units of all kinds, and the activities of top management. In describing the way the Technical system is planned and controlled, it has been found important to recognise the unprogrammed nature of many of the Technical activities. This does not imply, however, that the Supply and Technical System models are characterised by uniquely programmed and unprogrammed control respectively. Clearly, most real world activities have some programmed and some unprogrammed activities, with the programmed/unprogrammed classifications really being just the extremes of a continuum of task classifications.

Control Variables - Types

35. The notion of control variables used in the present report has been generalised as follows.

36. The type of formal planning and control model introduced at Paragraph 33 above is really most appropriate to programmed activity, in which all choice criteria are predetermined, and in which there are well-established performance criteria and measures of efficiency and effectiveness. In such cases the manager will have available control variables to which he can assign values in accord with the established input-output relationships, to achieve a level of system performance which meets predetermined criteria. This might suggest that the means by which, for example, the Technical system achieves a goal such as configuration integrity, which is not readily specified by a quantitative measure of performance, is not amenable to description within such a system model. This, however, is not the case. Although configuration integrity is not controlled by a set of mathematical control variables, there are a number of informal or qualitative measures of performance and associated controls. For example, in the case of configuration integrity, documents such as the configuration management plan and technical maintenance plan are used by the Technical system to ensure that this goal is achieved. By considering such documents as a generalised form of control variable, termed a control tool in the following discussions, planning and control aspects of both the Supply and Technical systems can be described using models of the type introduced at Paragraph 33.

Control Variables - Relationships

37. Reproduced at Figure 6.3 is the figure previously shown as Figure 5.10 and discussed in the main body of the report at Section 5, Paragraphs 41 to 110. This diagram represents the relationship of control variables/tools identified in the present model to operational goals, via a hierarchy of logistics goals. This hierarchical structure is developed in detail at Section 5, Paragraphs 55 to 99, and therefore is not discussed further here. The systems within the present model which assign values/use these control variables/tools, are listed at the base of Figure 6.3. Reference to the description of each of these systems in the body of the report gives details of these assignment/usage activities.

Control Variables - Time Response

38. The time response of various control variables (i.e. the elapsed time between application of various control variables/tools and a perceived response detected in a related performance measure), although referred to in the Terms of Reference, has not been addressed by the present study report. Whilst it is believed that the soft systems methodology has many advantages which recommend it to this type of study area, it does not model the time evolution of a system. Alternative modelling methodologies, which cast the system description in a form amenable to computer simulation, would directly address this aspect. Developments in this direction have been undertaken for some aspects of logistics activity in the case of the DSPOL-AF developed STOCKAID (STOCK Analysis and Investment Decision) model. It is emphasised, however, that such models do not attempt to describe the whole RAAF Logistics system.

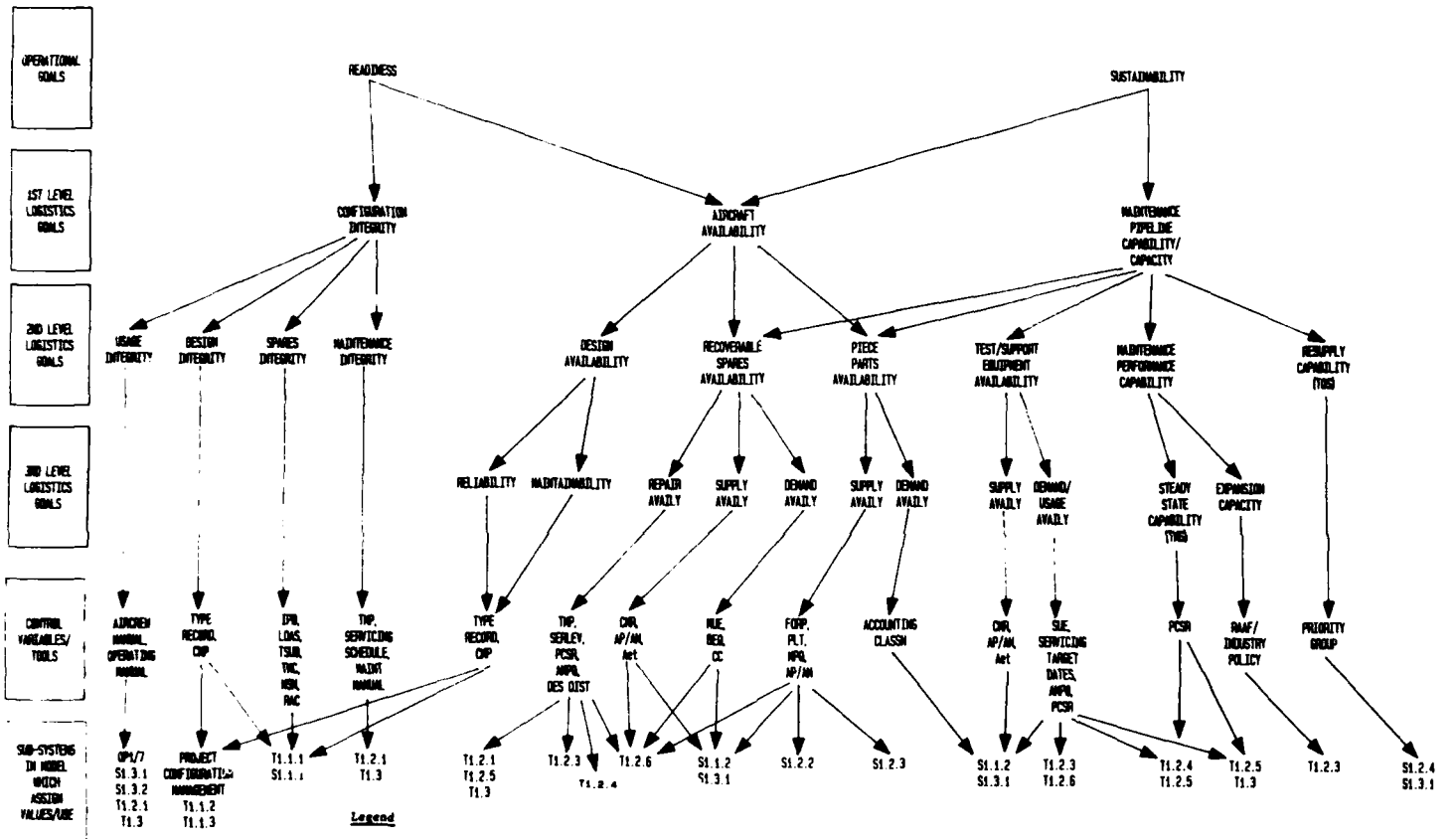
THE LOGISTICS SYSTEM AS A WHOLE

39. Up until now, consideration has been given to separate models of the Supply and Technical systems. In what follows, the Logistics system as a whole will be considered.

40. It has been stressed within the present report that the human activity systems identified within the model do not necessarily correspond to formal groupings within the organisation under study. Nevertheless, as a result of the approach described at Paragraph 6, the component Supply and Technical system models do align loosely with the formal division of manpower within the RAAF (i.e. Supply and Technical systems staffed respectively by members of the Supply and Engineer Branches, together with members of associated airmen musterings). In view of this, it might be legitimately asked how the component Supply and Technical system models fit together to form a 'Logistics' system. A model is now developed to provide a framework within which this might be examined.

A Generalised Logistics System Model

41. The following root definition of an In-Service Technical Logistics system is proposed:



Legend

Aet	Item Set Availability Target	DES DIST	Desired Distribution	PLT	Provisioning Lead Time
AMPQ	Annual Maintenance Programme Quantity	FORP	Forward Ordering Review Period	RAC	Requirements Amplification Code
AN	Non-Preferred Alternative	IPB	Illustrated Parts Breakdown	SERLEV	Servicing Level
AP	Preferred Alternative	LOAS	List of Assessed Spares	SUE	Scaled Unit Entitlement
BEQ	Base Entitlement Quantity	MPQ	Maximum Provisioning Quantity	TMC	Technical Management Code
CC	Control Code	MUE	Maintenance Supply Item Unit Entitlement	TMP	Technical Maintenance Plan
CMP	Configuration Management Plan	NSN	NATO Stock Number	TSUB	Technical Substitution
CMR	Calculated Minimum Requirement	PCSR	Production Control Status Requirement		

FIGURE 8.3 RELATIONSHIPS BETWEEN OPERATIONAL GOALS, LOGISTICS GOALS, MAIN CONTROL VARIABLES TOOLS AND SUB-SYSTEMS IN THE MODEL WHICH ASSIGN VALUES USE

a human activity system, manned by Service and civilian personnel, which undertakes, on behalf of the RAAF, those activities required to produce serviceable equipment for operational use through engineering and maintenance and by the supply of materiel required for engineering and maintenance activities, including essential transport links, subject to those environmental influences and activities described at Sections 2 and 3 of this report.

This root definition incorporates the definition of Technical Logistics given by the Study Control Group as a starting point for this study (see Section 1, Paragraph 7b).

42. A conceptual model consistent with this root definition is displayed at Figure 6.4, in terms of fourteen functional elements:

a. L1 - Understand Operational Requirement for Serviceable Equipment;

b. L2 - Understand Financial and Other Environmental Influences;

c. L3 - Develop Engineering Specification of Serviceable Equipment required for Operational Use, subject to Financial and other Environmental Influences;

d. L4 - Define Maintenance Activities required for Production of Serviceable Equipment;

e. L5 - Implement Maintenance Activities;

f. L6 - Determine Materiel Requirements to support Maintenance Activities consistent with Engineering Specification;

g. L7 - Determine Means of Satisfaction of Materiel Requirements;

h. L8 - Determine Essential Transport Links for Supply of Materiel;

i. L9 - Acquire Materiel and Transport Resources;

j. L10 - Supply Materiel to Maintenance Activities as required;

k. L11 - Conduct Maintenance Activities;

l. L12 - Monitor Activities L1 to L11;

m. L13 - Define Measures of Performance for Efficiency and Effectiveness of Supply of Serviceable Equipment for Operational Use; and

n. L14 - Take Control Action.

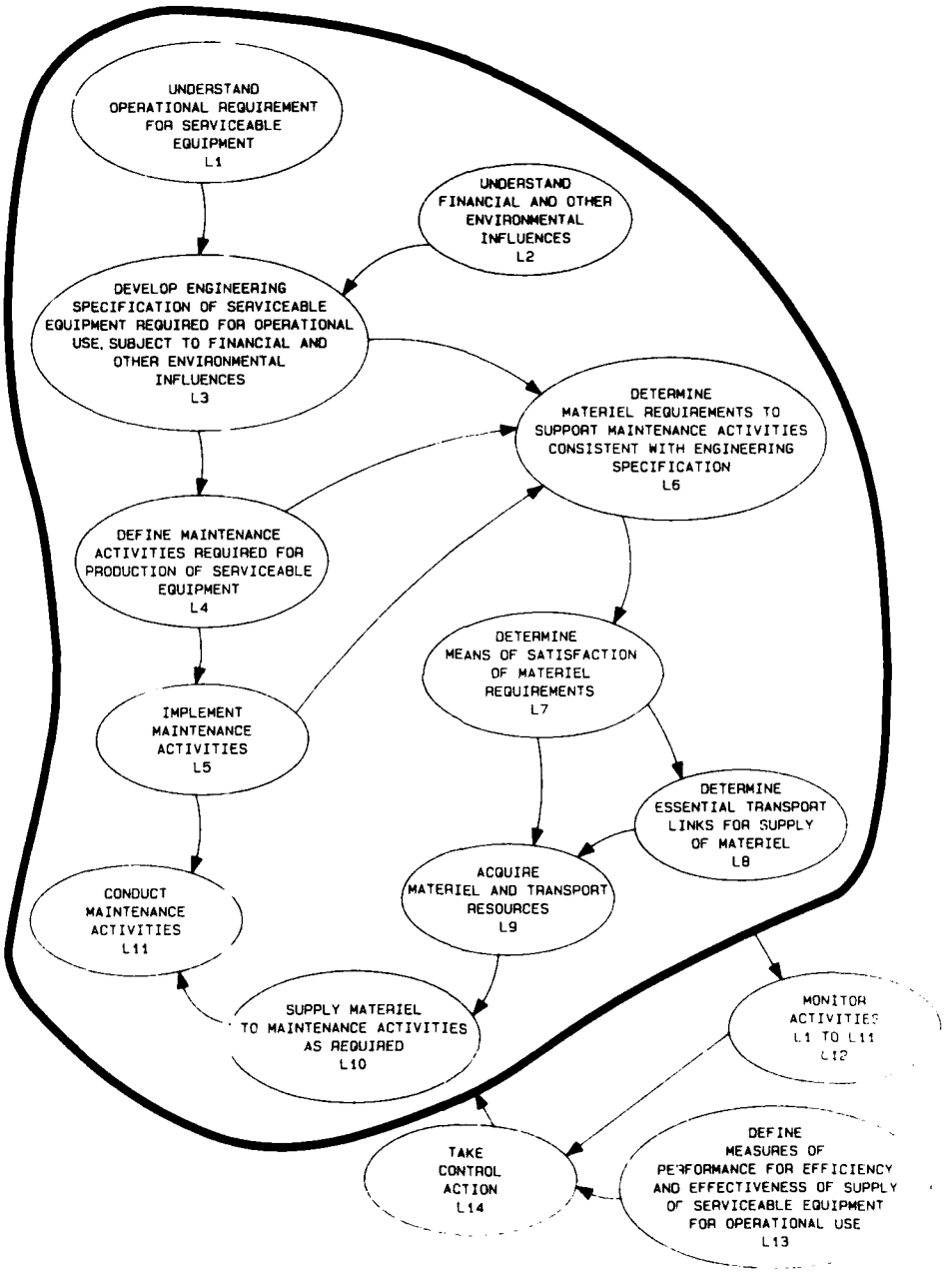


FIGURE 8.4 CONCEPTUAL MODEL OF IN-SERVICE TECHNICAL LOGISTICS (L) SYSTEM

43. It should be appreciated that this model represents a view of logistics activity which has not been constrained by any attempt to model present RAAF activities, in contrast with the Supply and Technical system models discussed to date.

Mapping of Supply and Technical System Models onto the Generalised Logistics System Model

44. In Figures 6.5 and 6.6, a mapping of the Supply and Technical sub-systems shown in Figures 6.1 and 6.2 onto the conceptual model of Figure 6.4 is shown. Functional sub-systems of the Supply and Technical system models which satisfy, in part at least, the purpose expressed in each of the Logistics system functional elements L1 to L14 are indicated.

45. It is stressed that the mapping given in Figures 6.5 and 6.6 involves an element of subjective judgement in its construction. It is presented as a framework against which the reader might better appreciate the roles played by the detailed Supply and Technical system models which have been developed. It is not intended as an analytic tool. Nevertheless, some simple observations can be made:

a. All sub-systems of the Supply and Technical system models can be identified as satisfying a purpose expressed in the wider Logistics system model, and manifestations of all Logistics system elements can be found in the Supply and Technical system models. To the extent that the Supply and Technical system models reflect the real world, this implies that, within the RAAF, activities can be found which purport to fulfill all the purposes expected by the Generalised Logistics system model. This mapping, however, says nothing about the effectiveness or efficiency with which these RAAF activities fulfill the wider logistics purposes;

b. The mapping of Supply and Technical systems onto Logistics model elements is not one-to-one. This reflects both the tendency for some broad logistics purposes to be carried out in the real world by a series of smaller functional systems, and the evolution of systems in the real world which, for often very justifiable reasons, carry out functions which satisfy simultaneously elements of the purposes expressed by more than one Logistics system function;

c. The identification of Supply and Technical system functions within the Generalised Logistics system model displays three broad groupings of activities. Logistics system functions L3 to L5, and L11, are located uniquely within the Technical system model. Functions L8 to L10 are located uniquely within the Supply system model. Functions L6 and L7, however, involve elements of both the Supply and Technical systems, and as such constitute the primary interface between the two systems. This interface, involving the determination of materiel requirements and the means of satisfaction of those requirements, involves

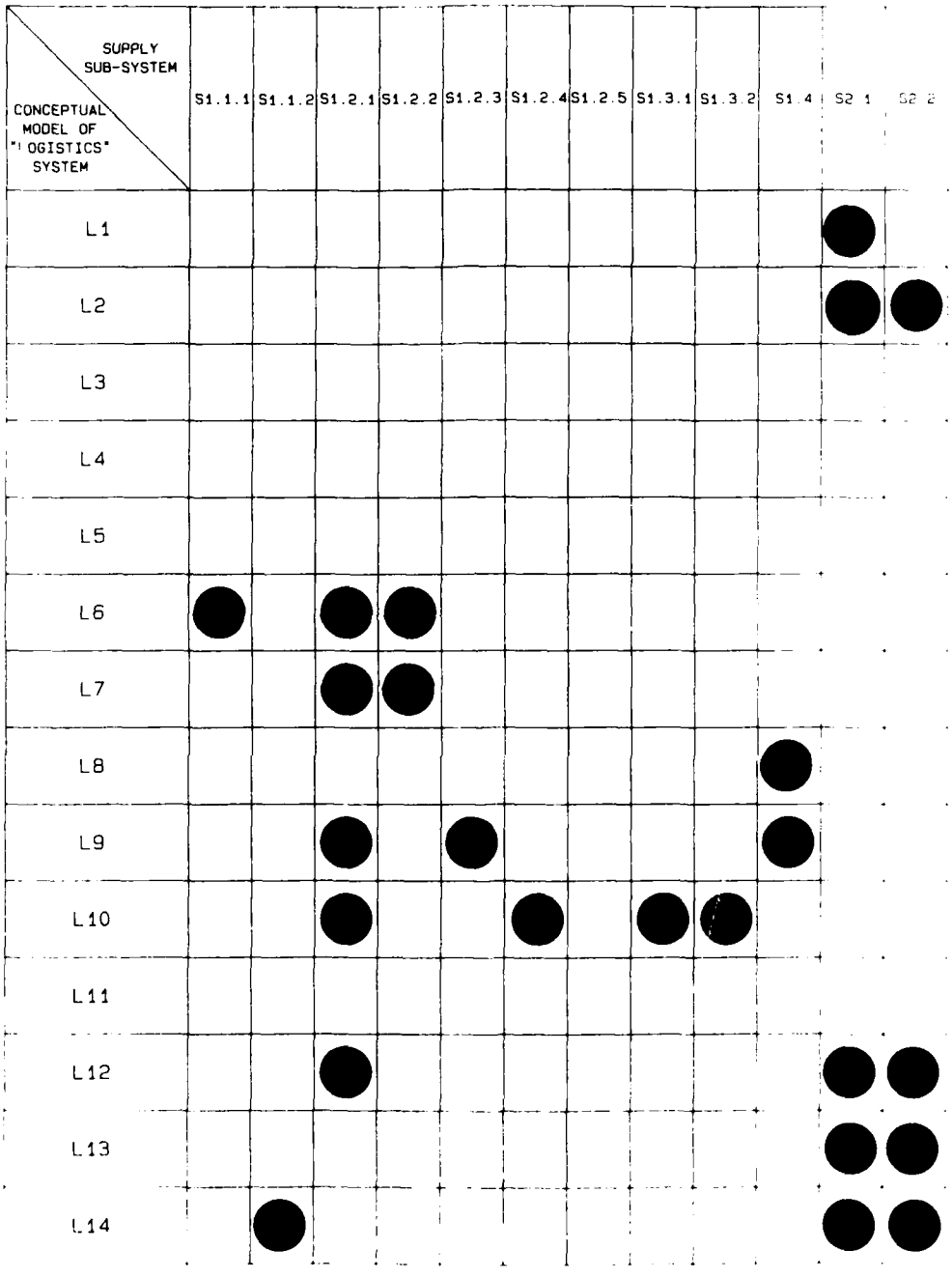


FIGURE 8.5 MAPPING OF SUPPLY SYSTEM ONTO CONCEPTUAL MODEL OF "LOGISTICS" SYSTEM

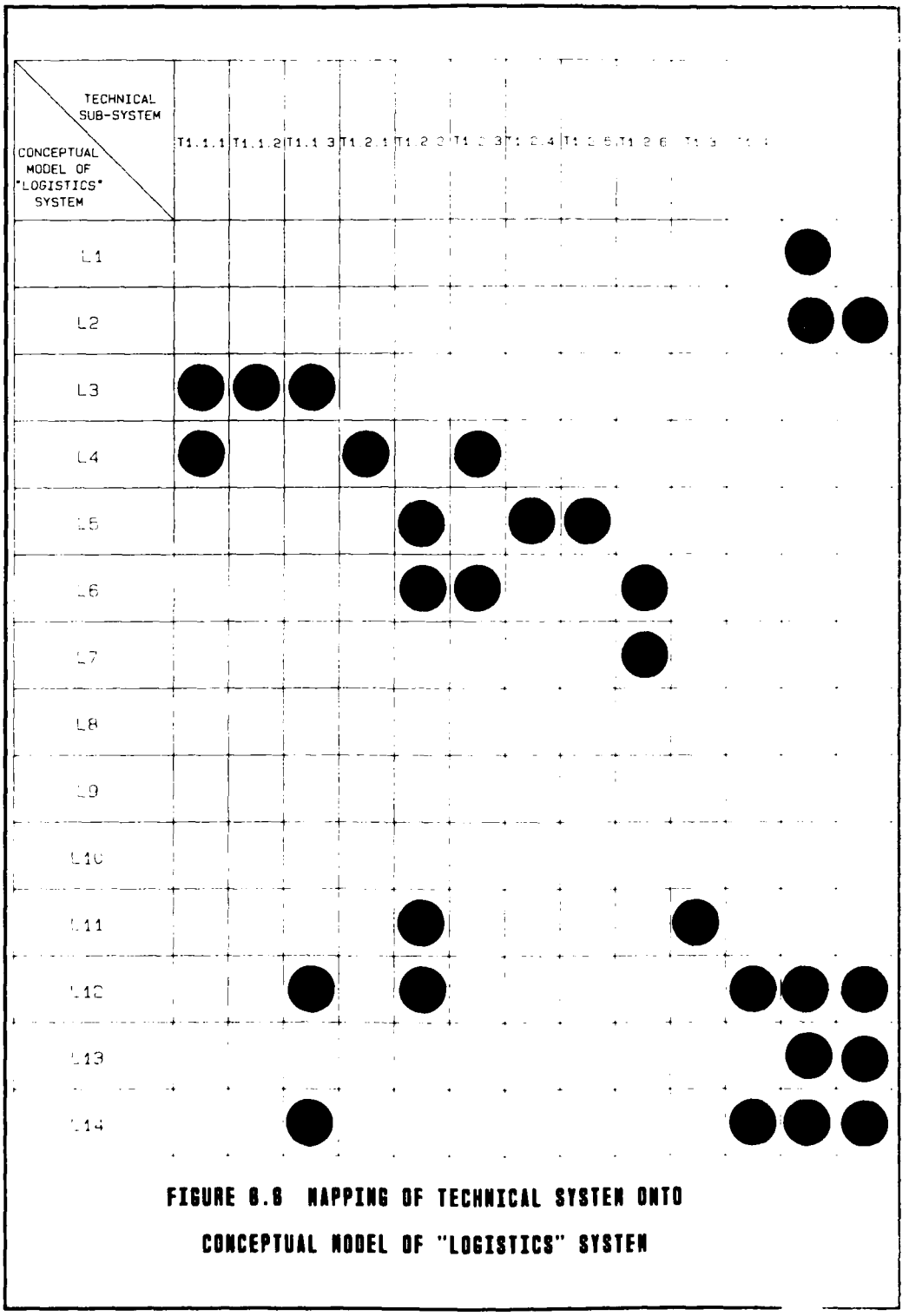


FIGURE 6.6 MAPPING OF TECHNICAL SYSTEM ONTO CONCEPTUAL MODEL OF "LOGISTICS" SYSTEM

the Maintenance Material Support Requirements Determination (T1.2.6), Codification and Cataloguing (S1.1.1) and Spares Requirements Extension (S1.2.2) systems, and might be viewed as a prime candidate for integration of Supply and Engineer Branch personnel. Indeed, this view of logistics activities would endorse moves in recent years to re-organise activities in these areas at HQSC in a way which integrates personnel into a corporate Logistics organisation based on role, rather than Branch affiliation;

d. Functions L12 to L14, which might be viewed as a model of a higher level planning and control function which looks at overall Logistics system performance, has been identified in Figures 6.5 and 6.6 with the amalgamation of activities described in the S2 and T2 sub-systems. A representation of the control variables/tools used by the Supply and Technical systems at present, in a form which relates these to Logistics system goals rather than uniquely supply or technical goals, has already been presented at Figure 6.3 and discussed at Paragraphs 32 to 38 above.

PROBLEM AREAS - DISCUSSION IN THE CONTEXT OF THE PRESENT MODEL

46. In the preceding, an overview of the models developed in the present study has been provided. These models provide a language for a structured debate on areas of concern. As a pointer to possible study topics, a number of perceived problem areas are now discussed briefly, in the context of the present model. The areas suggested span a range of activities from the translation of goals into requirements, to the specification of formats for management codes. It is emphasised that the identification of problem areas and recommendations for changes to the system was not the primary purpose of this study. The recognition of the following problem areas is essentially a by-product of the analysis and represents but a small sample of the problem areas which could have been chosen. These, and other problem areas, have been identified previously by a number of RAAF working parties.

Presentation of Operational Goals in a Format amenable to translation into Maintenance/Supply Support Criteria

47. It has been apparent to CSE that there is currently pressure being exerted by managers in both the Supply and Technical systems for the Operational system to restate goals in a more rigorous and quantitative way. It is argued that operational goals should be presented in such a way that they naturally frame maintenance goals, and allow maintenance planning, which will in turn define supply requirements. Currently, operational goals are quantified in terms of annual flying hours and one measure of daily on-line availability for each aircraft type. These highly aggregated parameters do not make explicit important factors in maintenance planning, such as deployment patterns, variability in

flying load and daily variations in sortie profiles. This matter has been previously raised, in various contexts, by a number of RAAF working parties (e.g. 'Investigation of Availability of Aircraft to meet Planned Rates of Effort and Tasks' (Coy Report) October 1978). There are associated problems in the specification of supply support. As has been pointed out ('Report by a DGSUP-AF Sponsored Study Group Formed to Examine Stockholding Policies and Resupply Procedures' (Collins Report) December 1979), there is a lack of suitable support criteria in the RAAF. For example, a unit may be achieving an off-the-shelf fill rate of 60 per cent, but there is no agreement by higher management as to whether this measure of performance is the right one, or even whether 60 per cent is an acceptable goal.

48. On the other hand, managers in the Operational system currently perceive operational goals as not being amenable to quantitative expression in any more than gross flying hour terms (see Section 2, Paragraphs 67 to 69), and supply and technical goals as being best expressed only in qualitative terms, e.g. 'most demands met in a reasonable time'.

49. Although the present study does not offer a quick fix to the problems outlined above, time has been spent attempting to structure the problem of relating operational goals to a hierarchy of logistics goals, and eventually to control variables/tools within the Logistics system. This structuring of the problem is presented at Section 5, Paragraphs 55 to 110.

Feedforward Control - Comparison of Supply and Technical Control Mechanisms

50. The concepts of feedback and feedforward control are well established (e.g. see J. Dermer 'Management Planning and Control Systems - Advanced Concepts and Cases' (Richard D. Irwin Inc., Homewood Illinois, 1977) page 211). Feedback control attempts to ensure conformance to expectations by comparing actual performance against original expectations and then adjusting either performance or plans to diminish any deviation that exists. Feedforward control, on the other hand, monitors variables other than output or performance. Instead, it monitors variables which 'drive' performance, and which therefore may change before performance itself changes. Such monitoring of variables that change ahead of performance allows anticipative control, as opposed to after-the-fact, or reactive, control.

51. Control mechanisms applied to the RAAF Logistics system have been reviewed in the present model at the Technical Operational Planning and Control (T2) system, and that subset of the control mechanisms particularly applied to the control of Supply system activities, has been reviewed at the Supply Operational Planning and Control (S2) system. Some of the identified control mechanisms, in particular those which are applied to maintenance forecasting, programming, tasking and production control, have aspects which would qualify, according to the above definitions, as feedforward control. Others, however, in particular that subset of controls described at the Supply Operational Planning and Control (S2) system, would be categorised as essentially feedback. New policy at

HQSC is to monitor production lead times in the aerospace industry, by equipment category, a mechanism which is essentially 'feedforward' control. It is recommended that studies be undertaken to investigate the potential for the further introduction of feedforward control mechanisms to the regulation of Supply system functions.

Determination of Maintenance Facility Capability and Capacity

52. The assessment of capability and capacity of maintenance facilities has been described at the Maintenance Level and Facility Analysis (T1.2.3) system. The term capability has been used to denote the possession of fixed resources for a particular set of tasks on a particular end item or repairable item. Several kinds of capacity have been defined, all being quantitative measures of the throughput of work of either a particular or general kind.

53. On the basis of the present study, it appears to CSE that the way in which these quantities are assessed by the RAAF is unnecessarily qualitative/judgemental. This is particularly the case with the assessment of facility capacity.

54. The capability of RAAF maintenance facilities is recorded in Technical Facilities Registers prepared in accordance with DI(AF) TECH 4-7. Comparable, detailed records of contractor facilities are normally held by contractors, and GSE listings for contractors are maintained by the Office of Defence Production and the RAAF (RO5, HQSC). Various directories listing the capabilities of Australian and overseas contractors are also available (e.g. 'Directory of Australian Defence and Offsets Oriented Industry'; and 'World Aviation Directory'). The capacities of RAAF and contractor depot level maintenance facilities, however, are currently only assessed in very gross terms, and the assessments consider only the maintenance manpower resource under normal peacetime conditions. Capacities of OLM and ILM facilities are assessed in even grosser terms. For example:

a. gross manhours available per annum, by trade, using establishment figures; and

b. the manhours allotted, by trade, in the Annual Maintenance Programme (AMP).

55. It is suggested that better estimates of throughput capacity than previous years' AMPs should be available, and it is recommended that RAAF maintenance facility analysis requirements be studied in detail with a view to the provision of more appropriate estimates of facility capability and capacity.

Validation of Repairable Item Assessment Methods

56. Techniques for the assessment of repairable item stockage levels using the PATTRIC model have been described at the Maintenance Material Support Requirements Determination (T1.2.6) system. In view of the established reliance now placed upon the results of the PATTRIC model assessment technique, and of the potential for further development of such models to assist in the

evaluation, in operational terms, of the effects of spares funding shortfalls or basic changes in maintenance concepts, the present study would strongly support research commitment to the design and development of appropriate data collection directed towards physical validation/further development of the relationships used in the PATTRIC model.

Specification of Assessment Determination Method

57. The assessment of long term (i.e. year to year) average usage rates/stockage levels/numbers of items required by maintenance programmes which support the RAAF flying effort has been described in the context of the Maintenance Material Support Requirements Determination (T1.2.6) system. As recognised in that model, essential to such activity is the specification of the assessment determination method and the agency responsible for procurement. The RAAF management code used to promulgate decisions in both these categories has been taken to be the Provisioning Category (PROCAT). Three groupings of assessment determination methods have been identified, i.e.

a. items subject to automated reprovisioning for which usage rates must be determined;

b. items subject to special assessment determination techniques, for which stockage levels must be determined; and

c. items subject to particular issue control techniques, for which numbers must be determined.

58. As commented on in the text, attempts to associate certain PROCATs uniquely with calculation techniques within these groupings, highlighted a number of ambiguities, many of which have been noted by other writers (e.g. 'Definitions and Management Concepts for Recoverable Items', GPCAPT E.B. Watson, 2501/11/17Tech(32), 16 Nov. 1984). For example, the classification of an item as repairable does not mean that there will not be some degree of wastage, and hence supply can be based upon either new procurement or repair. The available PROCAT categories, however, do not convey information as to which is predominant.

59. Proposals for the restructuring of management codes of several types have been put forward by GPCAPT Watson in the above reference. Whilst the present study does not wish to be seen as endorsing any of the proposals therein, it is recommended that studies be instituted with a view to the establishment of a code which conveys unambiguously management decisions on the two major factors to be defined in the assessing/procurement cycle, i.e.

a. the method by which the item is to be assessed; and

b. the agency responsible for procurement.

PROBLEM AREAS - GENERAL OBSERVATIONS

60. Although the Terms of Reference precluded investigation of matters related to manpower, one observation in this area is believed worthy of mention. One other observation about a matter not cast directly in terms of the models developed is also made.

Trade-off between Stock Holding and Manpower

61. It was observed by CSE, in interviews with a number of HQSC staff, that a significant fraction of available staff time was apparently spent on matters associated with the expediting of resupply of items assigned an Urgency of Need (UND) designation of A, with a consequent reduction in time available to complete other duties (see Section 4, Paragraph 273, for description of UND). There is obviously a trade-off in this area, which has not been quantified in any form, which could be discerned in the present study, between stock holding and manpower. Studies directed towards the development of a qualitative and, if possible, quantitative understanding of this trade-off are recommended.

Comparison of Depot/Intermediate/Operating Level Maintenance Management Procedures

62. It became obvious when studying areas described in the Maintenance Forecasting and Programming (T1.2.4) and Maintenance Tasking and Production Control (T1.2.5) models, that Depot level repair is intensively managed by SORO (including particularly, the careful costing of contractor maintenance manhours), whilst intermediate and operating level maintenance performed by the RAAF is not. Indeed, the documentation of intermediate and operating level management procedures is so sparse that the major parts of the T1.2.4/T1.2.5 system descriptions were concerned with the DLM process. Whilst it cannot be argued on the basis of the present study that there is any established requirement for a tightening of operating or intermediate level management procedures, it is recommended that a review of these procedures be undertaken to establish whether benefits would accrue from a tightening of approaches, in line with current practice for DLM management.

POSSIBLE DIRECTIONS FOR PHASE 2 OF THE RAAF LOGISTICS SYSTEM STUDY

63. To conclude the report, possible directions for Phase 2 of the RAAF Logistics System study are examined.

64. The second phase of the present study was projected as a quantitative examination of the effects of variations to the inputs to logistics sub-systems on appropriate systemic measures of performance and possible trade-offs between these inputs (see Annex A, Paragraphs 12 to 14). It was envisaged that this work might provide RAAF logistics managers with a model which would allow the quantitative assessment of the effects of resource modification on In-Service Technical Logistics system performance.

65. Such a proposal should be viewed against a background of USAF work in recent years, directed towards the development of Logistics Capability Assessment techniques (i.e. models to assess the ability to perform missions, expressed in operational terms, based upon logistics resources considerations). Models developed have been described by R.B. Watson in 'Air Force Logistics Capability Assessment - A Management Overview', CSE Working Paper AFLOG1, 1982, and are broadly categorised as follows:

a. Systems Dynamics Models - the computer implementation, by means of continuous simulation languages, of models expressed as a set of coupled differential equations governing the behaviour of a set of system variables;

b. Data Analysis Models - the relating of resources to aircraft flying hours by analysis of historical data, using multiple regression techniques;

c. Base Level Models - Monte Carlo simulations of aircraft operations, which attempt to evaluate the impact on aircraft operational availability of logistics support policies; and

d. Repairable Spares Models - analytic models which aim to assess the impact of a given repairable spares posture on aircraft availability.

Some progress has been made towards the development of a data analysis type model (Paragraph 65b above) for the RAAF Logistics system (see 'An Approach to Gross Statistical Modelling of RAAF Logistics', CSE Working Paper AFLOG3, 1985, B.K. McMillan). As pointed out in that paper, however, there are a number of practical, as well as conceptual, limitations to such input-output modelling. With regard to the other model types above, it should be noted that whilst all are valid approaches to the modelling of parts of the Logistics system, they fall short of the comprehensive model suggested at Paragraph 64 above. Such approaches are, nevertheless, analytic tools which could conceivably provide assistance to the manager.

66. It is the conclusion of CSE that a mathematical model of the RAAF Logistics system as a whole is infeasible, and that a Phase Two Study committed to development of such a model should not be undertaken. This conclusion has been reached based upon a fuller appreciation of the complexity of the RAAF In-Service Technical Logistics system, and in particular a recognition of the important role played by unprogrammed activities, as a result of the model development described in the main body of the report. Such a conclusion, however, echoes views expressed in the relevant literature. R.N. Anthony in 'Planning and Control Systems - A Framework for Analysis' page 84, for example, states that mathematical models of management control systems are unrealistic because:

a. models assume that a certain combination of inputs will result in a specified output, whereas the management control process applies to activities where the relationship between inputs and outputs is not known; and

b. models do not incorporate the effects of the influence of the system on human beings, whereas this influence is an essential characteristic of the management control process.

67. Professor P.B. Checkland, Department of Systems, School of Management and Organisational Sciences, University of Lancaster, U.K., who was employed as a consultant by DSTO in August 1985, was similiarly sceptical of the feasibility of a mathematical model to optimally relate overall inputs to overall outputs in a large organisation, such as the RAAF Logistics system. His reasons include the following:

a. In a large organisation such as the RAAF Logistics system, there are many decision takers whose decisions impact on the input-output relationship, and their attitudes, abilities and personalities would have to be included in the model.

b. Specification of the optimal input-output relationship for the total system would require the measurement of quantitative measures of performance for every sub-system. While for some sub-systems this may be feasible, at the higher levels of an organisation measures of performance are invariably fuzzy and unquantifiable (see also Wilson, 'Systems: Concepts, Methodologies and Applications' page 230, on this point).

c. The measures of performance for different sub-systems are often incommensurable, i.e. cannot be combined into one overall measure to allow system-wide trade-offs to be made. Measures of performance cannot all be expressed in financial terms, and should be defined on the basis of the set of activities that are being controlled.

68. This is not to suggest, however, that quantitative modelling of smaller parts of the system may not be valuable. For example, further development of the PATTRIC model for repairable item assessment, and development of models to assist in ground support/test equipment assessment, might be suggested. Such quantitative modelling, however, should only be taken up by management if there is clear, prior understanding of the way in which the results of such models would be interfaced with the other information used by managers in their decision taking. Systemic methodologies, such as the soft systems methodology applied here, can provide a framework for developing such an understanding.

69. Having argued against the development of mathematical models to relate overall inputs to overall outputs, this study suggests instead, two directions for future work which are believed to be both feasible and potentially valuable.

Identification of Feasible and Desirable Changes to the System - Use of Issue-Based Root Definitions

70. Possible methods of comparison of the conceptual models developed with the real world, in a form designed to yield feasible and desirable changes to the system, have been described at Paragraphs 10 to 13 above. Some problem areas which might be investigated further using such methods have been suggested at Paragraphs 46 to 59 above.

71. The comparison methods described at Paragraphs 10 to 13, however, if applied to the models reported in the present study, would probably yield only incremental changes to improve perceived problem situations. It is unlikely that solutions would be proposed which would require major re-organisation or re-structuring of present practices. This is a consequence of the decision taken in the present study to adopt root definitions which, according to the classification of P.B. Checkland ('Systems Thinking - Systems Practice' page 317), would be termed 'primary task'. These are definitions which are neutral accounts of public or 'official' explicit tasks which are embodied in an organisation.

72. It is suggested that there would be significant benefit if further investigation of those matters perceived as problem areas used approaches based upon what Checkland terms 'issue-based' root definitions. An issue-based root definition is a definition of a notional system chosen for its relevance to what the investigator and/or the people in the problem situation perceive as matters of contention. Investigations of this type would involve the redevelopment of conceptual models for the specific areas of interest based not upon the primary task root definitions used in the present work, but based upon one or more issue-based root definitions. The approaches advocated by Checkland ('Systems Thinking - Systems Practice' pages 221 to 223) would suggest that the subsequent debate and comparison of the conceptual models reported in this study, with those built using the issue-based root definitions, would provide a framework for the development of innovative, yet feasible, proposals for change.

Application of Soft Systems Methodology to Information Systems Analysis

73. An alternative direction for further study, using the conceptual models in the present work, is in the application of soft systems methodology to the analysis of information systems. Information systems analysis is a precursor to information system design. Information systems analysis is concerned with the development of a concept for the organisation on which information needs can be based, followed by specification of what information systems need to be designed or developed to support organisational needs. The information system design process then defines how support information is to be provided, and actions the implementation. CSE would not anticipate any involvement in information system design activities.

74. In the following, an approach described in detail by Wilson (see 'Systems: Concepts, Methodologies and Applications' Chapter 5), is outlined. This involves the use of primary task conceptual models of the type already developed by CSE, in a wider process of information systems analysis.

75. A schematic representation of the methodology for information systems analysis is given at Figure 6.7. It involves, in broad terms, five stages:

a. Develop an activity description of the organisation (or part of the organisation) under review, i.e. a primary task model. This stage defines what activities must be on-going for the system to function.

b. Derive the categories of information required to support the activities in the models and the particular models from which this information can be obtained. This will result in a set of activity-to-activity information flows being defined. This stage defines the minimum information needed to support the activities.

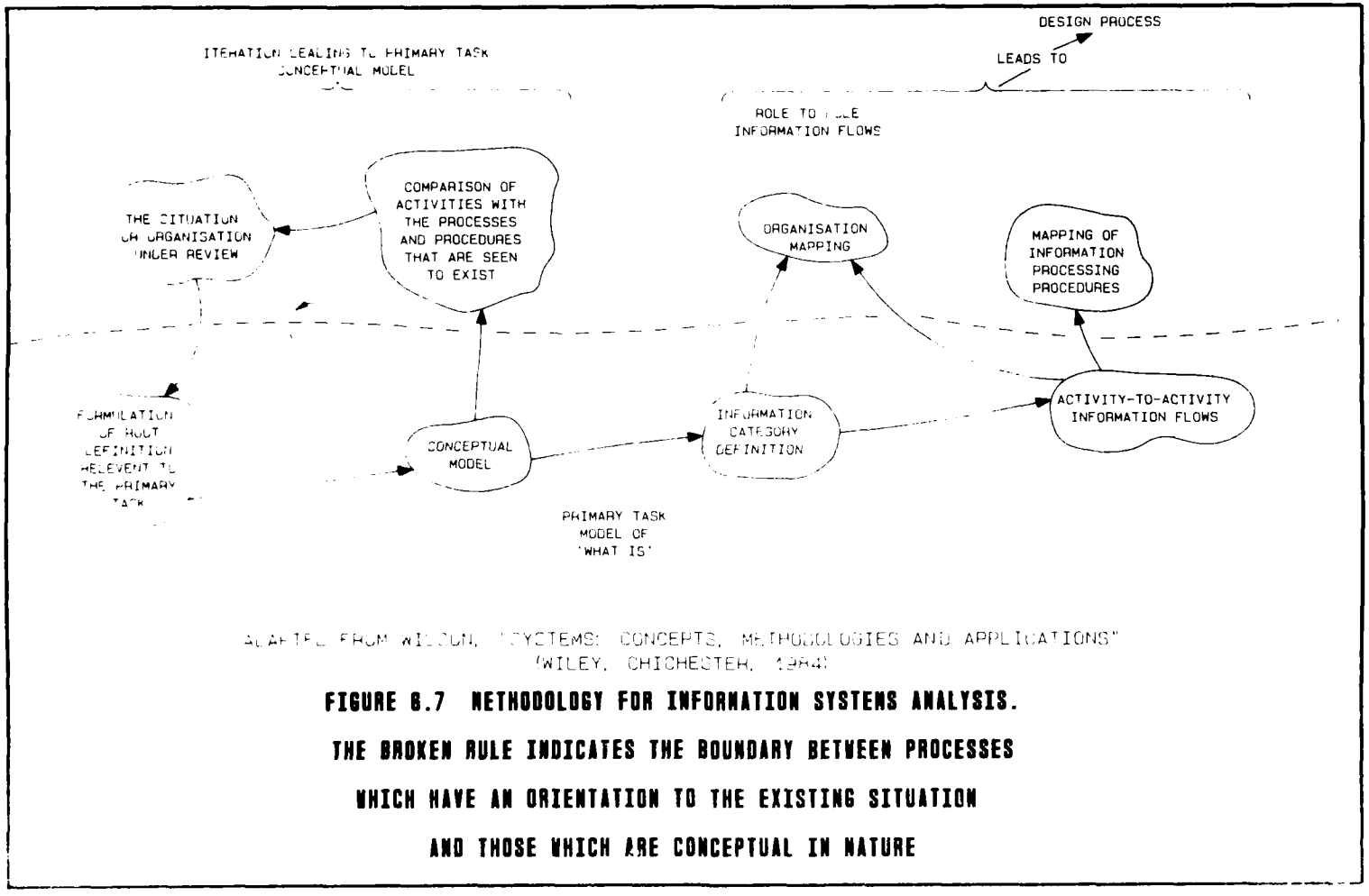
c. For a particular organisation structure, define management roles in terms of the activities for which each existing manager has the decision-taking responsibility. This stage defines who (in terms of role) is responsible for what set of activities.

d. Use these role definitions to associate the activity-to-activity information flows derived at Stage b. with particular managers within the organisation. This stage defines the minimum information flow pattern, i.e. who is responsible for supplying what information to whom.

e. Finally, define the information systems needed to match the performance needs of the activities each system is supporting so that one can make efficient use of both computing and manpower resources. This is a major stage, which merges into the system design process.

Further explanation of this methodology, including details of the 'Maltese Cross' technique recommended for use at Stages b. to d. above, is available at Chapter 5 of Wilson's book.

76. The iterative process leading to a primary task model of 'what is', displayed at the left hand side of Figure 6.7, and described above as Stage a. of the information systems analysis methodology, has been completed by CSE for the RAAF In-Service Technical Logistics system in the present study. It is suggested, in view of this, that information systems analysis of selected areas of the RAAF Logistics system, based upon that work and using the methodology outlined above, would provide a natural direction for future beneficial study.



ADAPTED FROM WILSON, "SYSTEMS: CONCEPTS, METHODOLOGIES AND APPLICATIONS" (WILEY, CHICHESTER, 1984)

FIGURE 8.7 METHODOLOGY FOR INFORMATION SYSTEMS ANALYSIS. THE BROKEN RULE INDICATES THE BOUNDARY BETWEEN PROCESSES WHICH HAVE AN ORIENTATION TO THE EXISTING SITUATION AND THOSE WHICH ARE CONCEPTUAL IN NATURE

CONCLUSION

77. This then brings to a close a very long report, on what has been a complex first phase of study of the RAAF Logistics system. What has been provided is a detailed, well-structured model of logistics activities. Possible directions for future work have been canvassed above. Such long-term considerations, however, should not blind one to the value of the Phase One study in its own right. If the present study succeeds only in providing a basis for a structured debate on problems such as those raised in this final section of the report, it will have made a worthwhile contribution to the conduct of logistics activities within the RAAF. Such debate, however, can only yield feasible and desirable directions for change if relevant RAAF management is willing to invest substantial time and effort in the understanding and interpretation of the models developed.

TABLE 6.1 ATTRIBUTES OF SUPPLY SYSTEM MODEL

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
Codification and Cataloguing (S1.1.1)	. Determine Item Name and Identification	Request for identification	Project Configuration Management, T1.1.2, T1.2.6	Catalogues and management data references	Project Configuration Management, T1.1, T1.2, S1.1.2		
	. Compare with Master File Description and Determine Whether New or Existing Catalogue Item	Information in support of identification	Project Configuration Management, Suppliers/ Manufacturers, T1.1.2, T1.2.6, T1.2.1	Catalogue changes	S1.2.1	Decision on whether new or existing catalogue item (Paragraphs 97 to 102)	
	. Apply RAAF Management, LOAS and Technical Substitution Data to File			Catalogue reports	S2		
Section 4, Paragraphs 81 to 127	. Process Catalogue Transaction	International co-operation	NATO Nations and other DCS users	International co-operation	NATO Nations and other DCS users		
	. Promulgate Data	Collaboration on Manufacturer's Code allocation	Suppliers/ Manufacturers	Collaboration on Manufacturer's Code allocation	Suppliers/ Manufacturers		
	. Monitor, Control and Refine Catalogue			Encouragement to participate in DCS	Other Government Departments		
		Advice on acceptability of configuration change	T1.1.1	Proposed configuration change	T1.1.1		
		RAAF Management, LOAS and Technical Substitution data	T1.1.1, T1.2.3, T1.2.6, S1.1.2				
Development of Supply Management Data (S1.1.2)	. Detect Need for Supply Item Management Data Initialisation or Modification	Technical system data suggesting need for data initialisation or modification	T1.2	Management codes	T1.2.6, S1.1.1		
(Material Demand/ Issue Controls Data Development Process)	. Formulate and Collate Supply Item Management Data Advice	Information in support of data initialisation or modification	T1.2, S1.2.1, OP2/OP3	Management parameter values	S1.2, S1.3	Decision on supply item management controls/parameters (Paragraphs 142 to 144)	

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
Section 4, Paragraphs 128 to 155	. Compare Advice with RAAF Supply System Aims/Policies and Determine Supply Item Management Controls/Parameters . Promulgate Supply Item Management Data to Appropriate Supply Sub-system Operational Controllers	Catalogues and management data references Supply system aims/policies, Management parameter formats Financial considerations and delegations	S1.1.1 S2.1 S2.2	Management reports	S2.1		
Stores Accounting and Transaction Processing (S1.2.1) Section 4, Paragraphs 176 to 202	. Process Stores Transactions . Maintain Stores Accounts (including Dues-in and Dues-out) . Maintain Stores Issue Frequency and Usage . Maintain Stores Transaction History . Monitor and Control the Accuracy of Stores Accounts and Transaction Processing	Catalogue changes Account balance/ dues record changes Issues from stores, Physical stock holding data Quarantine account changes	S1.1.1 S1.2.2, S1.2.3, S1.2.4, S1.2.5 S1.3.1 T1.1.3	Usage/Wastage, asset level data Stock location/ stock number cross reference Report on items in quarantine account	T1.1.1, T1.2.4, T1.2.5, T1.2.6, S1.1.2, S1.2.2, S1.2.4, S1.2.5 S1.3.1 T1.1.3		
Spares Requirements Extension (S1.2.2) [Central Provisioning Process]	. Detect Apparent Need to Buy Stock . Determine if Referral to Assessor is necessary or a Substitute Item is Available . Decide Whether to Buy or Take an Alternative Course of Action, and Initiate Supply	Advice on material requirements Inventory control levels Usage/Wastage, asset level data	T1.2.6 S1.1.2 S1.2.1	Request for advice on material requirements Buy/No Buy management decision	T1.2.6 S1.2.1	Decision on means of satisfying demand (Paragraphs 221 to 223)	

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
Section 4, Paragraphs 203 to 226	. Calculate Buy Quantity to Restore Assets to Total Liability Quantity . Modify Buy Quantity . Calculate Buy Quantity Distribution	Inability asset report Advice on buy quantity changes Special provisioning requests Operational rates of effort	S1.2.2 S1.2.3 S1.3.1 OP2/OP3	Buy quantity and distribution Demand for substitute item, Direction to induct RIs into repair or to redistribute stock, Loans to contractors Direction to program potentially repairable item into AMP Direction to hasten or divert dues-in ex.repair	S1.2.3 S1.2.4 T1.2.4 T1.2.5	Decision on buy quantity (Paragraphs 224 to 225) Decision on buy quantity distribution (Paragraph 226)	Buy quantity determined on basis of requirements advice against economic criteria (Paragraph 225)
Stock Procurement (S1.2.3) Central Direct Local Procurement Process Section 4, Paragraphs 227 to 263	. Determine Buy Process and Raise Appropriate Document . Funds Control - Approve or Amend Expenditure . Determine Source(s) of Supply and Request Quote(s) . Receive and Evaluate Quote(s) and seek Financial Concurrence . Dispatch Order to Supplier and Report to EDP . Monitor the Central Provisioning and Procurement Processes Progress the Central Provisioning and Procurement Processes	Provisioning review with recommended buy quantity and potential suppliers Funds for obligation (incl. resource) Quotes Quality assurance advice on suppliers Request for order change	S1.2.2 S2.2 Suppliers T1.4 Suppliers	Data on funds obligated Request for quotes Obligated funds (resource) Results of quality assurance monitoring activities Purchase order and amendments	S2.2 Suppliers Suppliers T1.4 Suppliers	Decision on buy process (Paragraph 232)	

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
		Consultation on buy quantity change or request for order change	S1.2.2, T1.2.6	Consultation on buy quantity change or request for order change	S1.2.2, T1.2.6	Decision on source of supply (Paragraphs 235 to 240)	Financial restraint against requirement for the item (Paragraphs 233 to 234 and 239 to 240)
				Report purchase/ receipt to EDP	S1.2.1		
		Stores depot acceptance time monitoring data	S1.3.1				
				Reports on delivery exceeding time frame	S1.3.1		
				Achieved provisioning lead time data	S2.1		
		Request to hasten dues-in in short supply	S1.2.2	Hastening of supply	Suppliers		
		Responses to requirements for hastening of assessing and provisioning	S1.2.2, T1.2.6	Hastening of assessing and provisioning	S1.2.2, T1.2.6		
		Advice re. spares for maintenance production programme	T1.2.5	Query re. maintenance tasking/ programming requirements	T1.2.5		
Stock Distribution (S1.2.4) [Wholesale-Retail Resupply Process]	. Detect Apparent Need to Resupply Stock to Retail Unit . Calculate Resupply Quantity and Priority Group, and Request Resupply . Search Stores Depot Account Balances and Decide Consignor Depot and Quantity to be Shipped	Item descriptive, usage/wastage and asset level data	S1.2.1			Decision on quantities of stock to be moved, consignor and consignee units (Paragraphs 273 to 277)	
		Stores depot account balance	S1.2.1	Request for stores depot account balance	S1.2.1		
		Retail replenishment level parameters	S1.1.2				
		Force activity designator	S2.1				

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
Section 4, Paragraphs 264 to 301	. Request Issue of Stock by Stores Depot	Priority demand for out of stock item	S1.3.1	Issue instructions for serviceable stock	S1.3.1		
	. Detect Issue of Stock by Stores Depot and Request Transport to Retail Unit	Notification of issue of stock by stores depot	S1.3.1	Request for movement with consignment details	S1.4		
	. Detect Receipt of Consignment by Retail Unit	Notification of receipt of stock by retail unit	S1.3.1	Report of issue by stores depot	S1.2.1		
	. Monitor Time in Resupply Pipeline			Report of receipt by retail unit	S1.2.1		
		Order for substitute item	S1.2.2	Inability asset report	S1.2.2		
				Hastening reports	S1.3.1		
Warehousing (S1.3.1)	. Receipt and Dispatch	Serviceable/ repairable stock (incl. resource)	External Suppliers of Equipment, S1.3.2, T1.3	Serviceable/ repairable stock (incl. resource)	S1.3.2, T1.3		
	. Unitisation and Storage						
	. Protective Treatment and Packaging	Issue instruction for serviceable/ repairable stock	S1.2.4			Decision on appropriate unitisation, storage layout and packaging of items (Paragraphs 321 to 335)	
Section 4, (Paragraphs 312 to 345)	. Issue Monitoring and Control	Issue instruction for item for disposal	S1.2.5	Stock for disposal (incl. resource)	Disposal Authority, S1.2.5		
	. Receipt and Acceptance Monitoring and Control	Stock location/ stock number cross reference	S1.2.1	Physical stock holding data	S1.2.1		
		Packaging specifications and policy	S2.1				
		Advice on quality assurance	T1.4	Results of quality assurance activities	T1.4		

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
		Demand for direct issue of stock	T1.3	Advice on item availability	T1.3	Decision on acceptability of item for issue/receipt (Paragraphs 336 to 345)	
		Hastening reports	S1.2.4	Priority demand for out of stock item	S1.2.4		
		Call forward of cargo	S1.4	Notify issue of stock	S1.2.1, S1.2.4		
		Notice of shipment in transit	S1.4	Notify receipt of stock	S1.2.1, S1.2.3, S1.2.4		
		Entitlement levels and accounting controls	S1.1.2	Special provisioning requests	S1.2.2		
				Report of suspected defect	T1.1.3		
Carrier Handling (S1.3.2)	.Not developed to higher level of resolution	Transport services (resource)	External transport services, OP1	Items delivered as required (incl. resource)	S1.3.1		Passenger against palletised cargo during load planning (Paragraphs 346 to 349)
Section 4, Paragraphs 346 to 349		Items to be transported (incl. resource)	S1.3.1				
		Carrier tasking, Loading instructions	S1.4				
		Carrier handling policy	S2.1				
Freight Transport Operations Management (S1.4)	.Select Mode of Transport .Maintain Cargo Backlog Boards by Mode, Source, Destination and Priority	Request for movement	S1.2.4	Call forward of cargo, Notice of shipment in transit	S1.3.1		
		Priority, properties, security classification of consignment	S1.2.4				
Section 4, Paragraphs 350 to 381	.Schedule and Task RAAF Scheduled Transport Services .Maintain RAAF Transport Task Boards for Scheduled and Unscheduled Services	Location of consignee	S1.2.4	Carrier tasking, Loading instructions	S1.3.2		

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
	. Allocate Cargo to RAAF Transport Services . Task Unscheduled RAAF Transport Services . Procure Contractor Transport Resources (All Modes) . Maintain Usage Histories of Freight Traffic by Routes	Contractor scheduled transport services, rates etc. RAAF allocated transport services Authorised expenditure of funds (incl. resource)	External transport services OP1 S2.2	Procurement of, and payment for, contractor transport services (incl. resource) Request for RAAF workload allocation Request for expenditure of funds *Usage history* of freight traffic	External transport services OP1 S2.2 S2.1, OP1	Decision on mode of transport (Paragraphs 359 to 364)	Financial restraint against priority of consignment/ need to meet movement time scale (Paragraphs 359 to 364)
Supply Operational Planning and Control (S2.1) Section 4, Paragraphs 30 to 69	. Define Supply Operational Plans/Performance Measures/ Goals/Objectives . Define Supply Operational Policies/Parameters . Measure Performance Data Relevant to Supply Objectives . Evaluate the Performance of the Supply System . Take Corrective Action	Goals, objectives and constraints of various systems including: Govt. "White Papers"; ACD171 and ASD235; annual budget appropriations; and resolutions of Defence and RAAF committees Operational performance data	Defence and RAAF Operational system, S2.2, T2 S1	Corrective action (i.e. redefined operational policies, control variables and parameters) Supply operational policies, control variables and parameters	Defence and RAAF Operational system, S2.2, T2 S1	Decision on supply operational plans/performance measures/goals/ objectives (Paragraphs 41 to 46) Decision on supply operational policies/parameters (Paragraphs 47 to 59) Decision on action to overcome ineffectiveness or inefficiency (Paragraphs 67 to 69)	Investment in inventory against availability required (Paragraphs 43 and 51 to 55)
Supply Financial Planning and Control (S2.2)	Not developed to a higher level of resolution in Section 4. Reported in Section 3, under the heading of the Defence Financial system	Budget appropriations (incl. resource)	Defence and RAAF Financial system	Supply financial policies, control variables and parameters	Defence and RAAF Financial system, S1.1, S1.2, S1.4, S2.1		

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
Section 4, Paragraph 11 and Section 3		Financial performance data	S1.1, S1.2, S1.4	Corrective action (i.e. redefined financial policies, control variables and parameters)	S1.1, S1.2, S1.4, S2.1 Defence and RAAF Financial system		Competition between RAAF supply expenditure requirements for finite budget allocation (Section 3)
		Supply operational policies, control variables and parameters	S2.1	Financial delegations (incl. resource)	S1.2, S1.4		

TABLE 6.2 ATTRIBUTES OF TECHNICAL SYSTEM MODEL

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
Configuration Definition and Control (T1.1.1)	. Define the Hierarchical Relationships of the MMIs in an Application and Cross Reference Other Applications of Each MMI	Production configuration baseline (incl. resource)	Suppliers, Manufacturers, Technical services contractors, RAAF project configuration management	Technical Management Code, Illustrated Parts Breakdown	T1.2.1, T1.2.6	Decision on whether an item of production satisfies an item of supply concept (Paragraphs 150 to 159)	
				Technical Management Code	T1.2.2		
				RAAFSUP/ COMPLAN link	S1.2.1		
Section 5, Paragraphs 132 to 184	. Define the Breakdown Spares and Support Equipment Required for Each MMI (by Stock Number and Part Number)	Nato Stock Number (Item of supply concept)	S1.1.1	List of Assessed Spares	T1.2.6, S1.1.1		
		Anticipated item consumption rate	T1.2.6	Technical Maintenance Plan Proposed Amendment	T1.2.1		
	. Define the Tolerances on the Physical and Functional Characteristics of an Application of an Item	Maintenance policy/ procedures	T1.2.1	Tolerance associated with application of an item	S1.1.1	Decision on whether to action proposed configuration change as a modification or a substitution (Paragraphs 176 to 180)	
				Technical Substitution Record	S1.1.1		
	. Define the Substitution Relationships between Stock Numbers by Order of Preference	Proposed configuration change	Suppliers, Manufacturers, Technical services contractors, Other users of equipment, OP6, T1.1.3, T1.2.1, T1.2, T1.4, S1.1.1	Configuration change classified as modification	T1.1.2		
	. Monitor Proposed Configuration Changes			Acceptability of a proposed [illegible]	S1.1.1	Decision on whether a proposed new substitution is acceptable (Paragraph 181)	
	. Assess the Support Cost Impact of a Proposed Configuration Change	Stock levels, Unit prices	S1.2.1	[illegible]	[illegible]		

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
	. Classify a Proposed Configuration Change as a Modification or a Substitution	Effects on economics of maintenance of proposed configuration change	T1.2.2, T1.2.6	Operational baseline configuration (including inspection requirements)	T1.4		
	. Decide Whether a Proposed New Substitution is Acceptable	Approved modification	T1.1.2				
	. Document Approved Changes and Update the Configuration Record	Technical data	T1.2.3, T1.2.5	Technical data	T1.1.3, T1.2.3, T1.2.5		
Modification Management (T1.1.2) Section 5, Paragraphs 185 to 215	. Evaluate the Cost of a Proposed Modification	Configuration change classified as modification	T1.1.1	Modification orders, Special Technical Instructions	T1.2.4, T1.2.6 T1.3	Decision on whether to proceed with modification (Paragraphs 193 to 202)	Benefits of improvement in performance, including consequent reduction in spare part consumption repair activity against cost associated with modification (Paragraphs 193 to 202)
	. Classify a Proposed Modification According to its Urgency of Incorporation	Modification engineering, maintenance and support policy	T2.1				
	. Estimate Cost of Proposed Modification and Include in Budget	Operational capability enhancement provided	OP6	Requirement for assessing, provisioning and procurement of modification kits	T1.2.6, S1.1.1		
	. Decide Whether to Proceed with Modification						
	. Prepare and Issue Modification Order/ STI	Installation, reliability, maintainability, testing and maintenance data	T1.2.1	Approved modification requiring update to configuration record, TMPs, servicing schedules, maintenance manuals, flight manuals and pilots' notes	T1.1.1, T1.2.1, OP7	Decision on urgency of modification incorporation (Paragraphs 198 to 199)	
	. Initiate Assessing/ Provisioning/ Procurement of Modification Kits	Availability of spares and GSE support	T1.2.6				
	. Initiate Amendments to Publications and other Data	Trials data	T1.3				

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
	. Maintain Record of Modification Orders/ STIs, Incorporation Status and Due Date . Control and Coordinate the Incorporation of Modifications	Consolidation, processing, approval and inclusion in the Budget of financial estimates	S2.2, T2.2	Consolidation, processing, approval and inclusion in the Budget of financial estimates	S2.2, T2.2		
		Records of modification orders/STIs, incorporation status and transactions to change recorded status	T1.3	Co-ordination and control of modification incorporation	T1.3		
		Due date for modification incorporation	T1.3				
		Equipment operating and maintenance lives	T1.2.2	Update of configuration records of equipment changed by modification	T1.2.2		
		Changes of status which could trigger modification	T1.2.2				
		Co-ordination of modification with maintenance production	T1.2.5	Co-ordination of modification with maintenance production	T1.2.5		
Defect Reporting and Analysis (T1.1.3)	. Conduct Preliminary Investigation of Suspected Defect . Report Defect . Determine Extent of Further Investigation of Defect	Suspected defect	Maintenance/ Technical services contractors, T1.3, S1.3.1	Defect report	Maintenance/ Technical services contractors,		
		Air incident report/ message	OP4		Manufacturers/ Suppliers, T1.4, T2.1, S1.2.3	Decision on extent of investigation required (Paragraphs [illegible])	

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
Section 5, Paragraphs 216 to 235	. Conduct Detailed Investigation of the Defect	Equipment operating life and maintenance arising history	T1.2.2				
				Transfer to quarantine account	S1.2.1		
	. Recommend Subsequent Actions Warranted	Report on items in quarantine account	S1.2.1	Request clearance of quarantine account	S1.2.1		
		Technical services for conduct of defect investigation (resource)	Maintenance/ Technical services contractors				
		Technical data to support defect investigation, and consultation on defect investigation	Technical system (various sources), Manufacturers/ Suppliers, Other users of equipment	Consultation on defect investigation	Manufacturers/ Suppliers, Other users of equipment		
				Recommendations regarding: design;	T1.1.1		
				maintenance procedures;	T1.2.1	Decision on actions warranted as a result of defect investigation (Paragraphs 231 to 235)	
				spares assessing	T1.2.6		
				Investigation report and recommendations	T2.1		
				Recommendation for warranty action	S1.2.3		
				Recommendation for repair/ overhaul	T1.2.4		
				Recommendation for disposal	S1.2.5		

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
Maintenance Task Requirements Determination (T1.2.1)	. Determine Effects of Failure of System	Maintenance plans and manuals (resource)	Suppliers, Manufacturers and other users of equipment				
	. Determine Item Failure Modes and Effects	Illustrated Parts Breakdown, Tecnnical Management Code, Inherent reliability data	T1.1.1	MMI Maintenance procedures, Proposed configuration change	T1.1.1	Decision on whether scheduled or unscheduled maintenance (Paragraphs 284 to 286)	
	. Determine Tasks Necessary to Detect/ Prevent/Correct Failure of an Item	Technical Maintenance Plan Proposed Amendment	T1.1.1, T1.1.2, T1.2.5, T1.3				
Section 5, Paragraphs 253 to 304	. Evaluate Economics of Maintenance Tasks	Modification Orders, Special Technical Instructions	T1.1.2	Advice on modification maintenance	T1.1.2		Benefits of various maintenance tasks, intervals, facilities and support equipment against cost associated with maintenance actions (Paragraphs 276 to 283)
	. Decide Whether Task is Scheduled or Unscheduled	Defect investigation reports and recommendations	T1.1.3				
	. Decide Scheduled Maintenance Intervals and Latitudes	Failure history	T1.2.2	TMP (via COMPLAN)	T1.2.2	Decision on optimal interval if scheduled maintenance (Paragraphs 287 to 289)	
	. Allocate Tasks to Maintenance Processes	Possible repair locations and turn-around times	T1.2.3	Repair level analysis, TMP (Part 1., Maintenance manuals, Allocated facilities	T1.2.3		
	. Prepare and Issue Maintenance Publications/Data						

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
	. Monitor and Control Accuracy of Maintenance Publications/Data	Standard manhours and processes	T1.2.4	TMP Maintenance manuals	T1.2.4, T1.2.6, S1.1.1		
				TMP, Maintenance manuals, Servicing schedules	T1.2.5, T1.3	Decision on whether failed item should be repaired or replaced (Paragraphs 290 to 294)	
		Request change in maintenance policy for potentially repairable item	T1.2.6	Revised repair scheme for potentially repairable item	T1.2.6		
		Consultation on possible material support options	T1.2.6	Consultation on possible material support options	T1.2		
		Results of investigation of repair scheme, Workshop records and advice on failure modes	T1.3	Request for investigation of repair scheme	T1.3		
		Quality assurance advice re. maintenance inspection requirements	T1.4				
		Technical policy, Maintenance and support concepts	T2.1	Task requirements consistent with technical policy	T2.1		
		Planned rate of effort, Planned deployment	OP2, OP3				
		Flight manual, Mission profiles, Air Incident Reports	OP4, OP7				

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
Maintenance Accounting and Transaction Processing (T1.2.2)	. Process Maintenance Transactions	Data input to CAMM and MAARS (eg. Aircraft Maintenance Form, Unserviceable Technical Equipment Label, Record of Unserviceabilities and Component Changes, CAMM Maintenance Worksheet, TMP)	T1.3	CAMM output	T1.3		
	. Maintain Record of Identification (Name, TMC, Serial/ Tail Number, Part Number, Work Zone Code) and TMP of Technical Equipment						
	. Maintain Record of Status (Serviceability, Location, Job) of Technical Equipment	Physical records on equipment for checking purposes	T1.3				
		Configuration changes	T1.1.2	Operating life, Maintenance arisings	T1.1.2		
Section 5, Paragraphs 305 to 364	. Maintain Record of History (Operating Life, Maintenance Life Remaining, Servicings and Failures) of Technical Equipment	TMP (via COMPLAN)	T1.2.1	Failure history	T1.1.3, T1.2.1		
				Measured times to make serviceable	T1.2.3		
	. Maintain Record of Maintenance Manhours and Delays Incurred			Historical arising data	T1.2.4 (DLM), T1.2.6		
				Manhours expended, Historical arising data	T1.2.4 (ULM), T1.2.6		
	. Monitor and Control the Accuracy of Maintenance Records						

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
Maintenance Level and Facility Analysis (T1.2.3)	. Allocate the Maintenance Facilities and Servicing Level of an RI	Support concept of end item, Facility policy and engineering standards	T2.1	Facility capabilities and capacities	T2.1		
	. Assess the capabilities and Capacities of Maintenance Facilities and Changes Required	Repair level analysis, TMP (Part 1), Maintenance manuals	T1.2.1	Possible repair locations and capabilities, Turn-around times	T1.2.1	Decision on allocation of a servicing level and maintenance facility (Paragraphs 372 to 392)	
Section 5, Paragraphs 365 to 403	. Define Standard Turn-around Times for Maintenance of an RI	Expected annual number of maintenance arisings, standard manhours per maintenance process	T1.2.4	Allocated facilities	T1.2.1		
	. Initiate Confirmation of Requirements and Supply of GSE and Technical Data to Maintain an RI			Servicing level code	S1.1.1		
		Contractor support required, Quotes	Maintenance contractors	Task evaluation data, Period contracts	Maintenance contractors		
	. Arrange a Period Contract for Contractor Maintenance	Past years' AMPs	T1.2.4	Facility capabilities and capacities, Standard times to make serviceable, Contractor quotes	T1.2.4		
	. Monitor the Performance of Maintenance Facilities and Update Capabilities, Capacities and Standard TMSs	Consultation on Standard times to make serviceable, Hastening action in response to production shortfall, Aggregate production, Times to make serviceable required and achieved	T1.2.5	Standard times to make serviceable	T1.2.5		

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
		Measured times to make serviceable	T1.2.2	Maintenance facility requirements and performance data	T1.2.6		
		Quality assurance advice re. facility requirements	T1.4	Technical data required by maintenance facilities	T1.1.1, T1.2.1		
		Measured order and ship time	S1.2.4				
		Consultation on financial aspects of maintenance contract	T2.2	Consultation on financial aspects of maintenance contract	T2.2		
Maintenance Forecasting and Programming Depot Level Maintenance Process Section 5, Paragraphs 404 to 441	. Forecast Maintenance Arisings (Long Term and Short Term) for Technical Equipment	Historical maintenance arising data for repairable items and ground support equipment	T1.2.2				
	. Determine Order Quantity and Planned Carry Over (by item	Planned operational rate and resource usage data	OP2, OP3			Decision on quantity of a technical item to programme into DLM for the forecast period (Paragraphs 417 to 423)	Benefits of the programming of various items into maintenance within the constraint of a finite maintenance budget (Paragraphs 431 to 434)
	. Define Standard Manhours per Maintenance Process	Estimated mean time between removals, Time between DLM servicings and overhauls, Maintenance manuals	T1.2.1				
		Information regarding items subject to modification	T1.1.2				

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
	. Allocate Workload to DLM Facilities (by Item and in Aggregate)	Information regarding items subject to defect investigation	T1.1.3				
	. Prepare Financial Estimates and Amend Draft AMP	Calculated minimum requirement and desired distribution for repairable items	T1.2.6	Long term average arising rates, Annual maintenance programme	T1.2.6		
		Serviceable and repairable item asset levels	S1.2.1				
		Request to initiate repair of items as a result of potentially repairable item considerations	S1.2.2				
		Facility capabilities and capacities, Standard times to make serviceable, Contractor quotes	T1.2.3	Expected annual number of maintenance arisings, Standard manhours per maintenance process, Annual maintenance programme	T1.2.3		
		Update of programme driving factor parameters, Forecast output of technical equipment (Stagger Charts Facility aggregate floorloads	T1.2.5	Annual maintenance programme, Maintenance programme driving factor data, Time between DLM servicings and overhauls	T1.2.5		

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
		Advice on standard manhours expended	T1.3	Annual maintenance programme	T1.3		
		Collaboration on preparation of financial estimates for AMP	T2.2	Collaboration on preparation of financial estimates for AMP	T2.2		
		Manhour rates	Maintenance contractors	Annual maintenance programme	Maintenance contractors		
Maintenance Tasking and Production Control (T1.2.5) Depot Level Maintenance Process) Section 5, Paragraphs 442 to 485	. Plan Production Output Requirements for Technical Equipment . Task DLM Facilities with AMP Workload . Approve or Amend the Obligation of Funds . Authorise Issue of Repairable Items to Work (Automatically or Manually) . Monitor and Evaluate Programme Driving Factors, Asset Levels, and Progress of the AMP (by Item and in Aggregate) . Correct Production Input and Output at DLM Facilities	Annual maintenance programme, Maintenance programme driving factor data, Time between DLM servicings and overhauls, CAMM data	T1.2.4	Update of programme driving factor parameters, Forecast output of technical equipment (Stagger Charts), Facility aggregate floorloads	T1.2.4	Decision on updates required to programme parameters to achieve required maintenance production (Paragraphs 465 to 485)	
		Serviceable repairable asset levels	S1.2.1				
		Standard times to make serviceable	T1.2.3	Update on standard times to make serviceable	T1.2.3		
				Facility capability/ capacity data, Hastening action on Tech. data/ GSE in response to production shortfall	T1.2.3		
		Consultation on new spares production programme	S1.2.3	Consultation on new spares production programme	S1.2.3		

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
	. Initiate Update of Programme Parameters and Related Data	TMP, Servicing schedules, Maintenance manuals	T1.2.1	Proposed amendments to TMP	T1.2.1		
		Consultation on hastening of repair or diverting of output	S1.2.2	Consultation on hastening of repair or diverting of output	S1.2.2		
				Spares deficiencies and hastening action on spares for AMP, Updates on percentage replacement factors	T1.2.6		
		Production returns, Deficiency reports, Manhours expended reports, Maintenance variation reports	T1.3	Maintenance orders, Job orders, Quarterly output requirements, Time to make serviceable, Correction of work output	T1.3		
		Funds to be obligated (resource)	T2.2	Obligation of maintenance funds	Maintenance contractors		
		Reports on status of MSIs	S1.2.4	Reporting and amending of Purchase Orders Maintenance and Job Orders	S1.2.4		

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
Maintenance Material Support Requirements Determination (T1.2.6)	. Appreciate Data Relevant to Determination of Material Support Requirements	Maintenance and support concepts	T2.1	Material support advice on proposed configuration change	T1.1.1	Decision on selection of assemblies, sub-assemblies and breakdown spares required by maintenance programmes (Paragraphs 494 to 502)	
		Availability targets	T2.1				
	. Recognise and Respond to Need for Advice on Material Support Requirements Extension	Resource and operational rate planning data, Operational profile data	OP2, OP3, OP7	Material support advice on proposed modification	T1.1.2		
	. Specify Material Support Requirements Extension *Responsibility and* Assessment Determination Method	Equipment configuration data	T1.1.1, T1.1.2, Suppliers, Manufacturers, *Other users of* equipment	Initial material support *assessment*	T1.2.1	Decision on assessment determination method and requirements extension responsiblity (Paragraphs 503 to 513)	Item availability against cost associated with inventory enhancement (Paragraphs 514 to 543)
				Advice re. local manufacture	T1.3		
Section 5, Paragraphs 486 to 553	. Determine Usage Rates for Items subject to Automated Reprovisioning	Equipment reliability data	T1.2.2, T1.2.5 T1.1.3	Calculated minimum requirement, Desired distribution	T1.2.4		
		Maintenance policy and task requirements	T1.2.1, T1.2.4				
				Provisioning categories, Technical Assessment	S1.1.1	Decision on usage rates/ stockage levels/ numbers of items (Paragraphs 514 to 543)	
	. Determine Stockage Levels for Items subject to Special Assessment Determination Techniques	Maintenance facility requirements	T1.2.3				
		Maintenance performance data	T1.2.3	Advice on material requirements	S1.2.2		
	. Determine Numbers of Controlled and Scaled Items in support of Maintenance	Existing support resources data	S1.1.1, S1.2.1				
		Support resource usage/ wastage data	S1.2.1				
	. Promulgate Assessed Material Support Data	Provisioning lead time data	S1.1.2				

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
		Item cost data	Suppliers/ Manufacturers				
	. Monitor, Control and Refine Material Support Requirements Determination Data Base and Methods	Request for identification and supply of item	S1.2.2	Request for identification	S1.1.1		
		Scaling variation request, Provisioning review, Interim provisioning review, Inability asset report, Potentially repairable item review	S1.2.2				
		MUE variation request, ERG, Notification of potentially repairable item	T1.3				
		Request for engineering advice on procurement activities and request for order change	S1.2.3	Advice on procurement activities and request for order change	S1.2.3		
		Revised repair scheme for potentially repairable item	T1.2.1	Request change in maintenance policy for potentially repairable item	T1.2.1		
		Allocated CSER and SPEC provisioning categories	S1.1.2				
		Decision on entitlement variation request	S1.1.2	Scaling variation request, MUE variation request, ERG, Advice on entitlement variation and SPEC item distribution decisions	S1.1.2		

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
		Spares deficiencies and hastening action on spares for AMP	T1.2.5				
		Progression activity	S1.2.3				
Technical Workshop Operations (T1.3)	. Order, Receive, Dispatch and Marshal Technical Equipment	Serviceable material receipts (incl. resource)	S1.3.1, OP1	Serviceable material dispatches (incl. resource)	S1.3.1, OP1		
	. Investigate, Inspect and Test Technical Equipment	Unserviceable material receipts (incl. resource)	S1.3.1, OP1	Unserviceable material dispatches (incl. resource)	S1.3.1		
		Advice on availability of item demanded	S1.3.1	Demand for technical item, modification kit etc.	S1.3.1		
Section 5, Paragraphs 554 to 611	. Perform Rectification, Manufacture and Modification	Operating life and maintenance interval data	T1.2.2	Identification of equipment received/ dispatched and notification of maintenance activities completed	T1.2.2		
	. Prepare Technical Equipment for Long-Term Storage						
	. Workshop Tasks Planning and Control	Advice on local manufacture of equipment	T1.2.6	MUE Variation requests, ERGs, Notification of potentially repairable item	T1.2.6		
		Requirement for modification, and instructions/ orders regarding modification	T1.1.2	Advice on modification status of equipment and results of modification trials	T1.1.2		

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
		TMP, Servicing Schedules, Maintenance Manuals, Flight Test Schedules etc.	T1.2.1	Advice on failure modes, Proposed amendments to TMP	T1.2.1		
		Request for investigation of repair scheme	T1.2.1	Results of investigation of repair scheme	T1.2.1		
		Quality assurance advice re. maintenance inspection requirements	T1.4	Results of investigation of maintenance errors	T1.4		
				Suspected defect	T1.1.3		
		Aircrew advice on post-flight serviceability, including test flights	OP1	Advice on aircraft availability/ serviceability	OP1		
		Air incident investigation reports	OP4				
		Co-ordination of aircraft operations with workshop operations	OP1	Co-ordination of aircraft operations with workshop operations	OP1		
				Engineering change proposals, Draft modification orders	T1.1.1		
		Aircraft scheduled servicing target dates	T1.2.4 (Unit Level Process)	Short term corrections to unit level maintenance plan	T1.2.4 (Unit Level Process)		

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
		Annual maintenance programme	T1.2.4 (Depot Level Process)	Advice on standard manhours	T1.2.4 (Depot Level Process)		
		Maintenance orders, job orders, quarterly output requirements, time to make serviceable	T1.2.5 (Depot Level Process)	Production returns, Deficiency reports, Manhours expended reports, Maintenance variation requests	T1.2.5 (Depot Level Process)		
Quality Assurance (T1.4)		Technical goals	T2	Quality assurance advice re. equipment specifications	RAAF project configuration management		
	. Define Quality Assurance Policies and Quality Control Requirements consistent with Technical Goals	Quality assurance concept	Government/ Defence Central				
Section 5, Paragraphs 612 to 648	. Develop Quality Control Procedures and apply to Logistics system Functional Elements	Operational baseline configuration (including inspection requirements)	T1.1.1	Quality assurance advice re. facility requirements	T1.2.3		
	. Monitor Quality Control Performance	Data on purchasing/ tender/quote evaluation	S1.2.3	Quality assurance advice re. purchasing/ tender/quote evaluation	S1.2.3		
	. Evaluate Quality Control Performance	Data on Suppliers/ Contractors procedures	Suppliers/ Contractors	Implementation of Approved Firms/Labs System	Suppliers/ Contractors		
	. Take Corrective Action to Improve Quality Control Performance	Data on products received/ stored/ issued	S1.3.1	Quality assurance advice re. receipt/ storage/ issue of products	S1.3.1		

System	Functional Elements	OUTPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
		Data on maintenance errors	T1.3	Quality assurance advice re. maintenance inspection requirements	T1.2.1, T1.3		
		Defect report	T1.1.3	Quality assurance advice if faulty design suspected	T1.3.1		
Technical Operational Planning and Control (T2.1) Section 5, Paragraphs 41 to 110	. Define Technical Performance Measures/Goals/ Objectives . Analyse Operational Concept and Formulate Support Concept for New Technical Equipment . Define Technical Policies/Parameters for In-Service Support of All Technical Equipments . Measure Performance Data Relevant to Technical Objectives . Evaluate the Performance of the Technical System . Take Corrective Action	Goals, objectives and constraints of various systems including: Govt. "White Papers"; ACD171 and ASD235; annual budget appropriations; and resolutions of Defence and RAAF committees	Defence and RAAF Operational System, T2.2, S2	Corrective action (ie. redefined operational policies, control variables and parameters)	Defence and RAAF Operational System, T2.2, S2	Decision on performance measures/goals/objectives (Paragraphs 55 to 69) Decision on support concept for new Technical Equipment (Paragraphs 70 to 74) Decision on technical policies/parameters (Paragraphs 75 to 99) Decision on action to match performance more closely to technical objectives (Paragraphs 100 to 110)	Investment in engineering and maintenance against levels of operational readiness and sustainability which can be achieved (Paragraphs 55 to 99)
		Operational performance data	T1	Technical operational policies, control variables and parameters	T1		
Technical Financial Planning and Control (T2.2)	. Not developed to a higher level of resolution in Section 5.	Budget appropriations (incl.resource)	Defence and RAAF Financial system	Technical financial policies, control variables and parameters	Defence and RAAF Financial system, T1, T2.1		Competition between RAAF technical expenditure requirements for finite budget allocation (Section 3)

System	Functional Elements	INPUTS (Information/ Resource)		OUTPUTS (Information/ Resource)		Decision	Trade-Off
		Type	Source	Type	Destination		
	Reported in Section 3, under the heading of the Defence Financial system	Financial performance data	T1	Corrective action (ie. redefined financial policies, control variables and parameters)	T1, T2.1, Defence and RAAF Financial system		
Section 5, Paragraph 22 and Section 3		Technical operational policies, control variables and parameters	T2.1	Financial delegations (incl. resource)	T1.2		

LIST OF ABBREVIATIONS

AAFMAINT	Administrative Assistant, Finance-Maintenance
ACA	Account Correction Advice
ACD	Australian Confidential Document
ACDFS	Assistant Chief of the Defence Force Staff
ACLOGP	Aircraft Log Permanent
ACMAL	Aircraft Maintenance Report
ACOP	Aircraft Operations
ACPRI	Aircraft Priority
ACRE	Aircraft Reception
ACSC	Aircraft Status Change
ACT	Active
ACTC	Aircraft Target Change
AD	Aircraft Depot
ADCS-LS	Assistant Deputy Chief of Staff of Logistic Support
ADF	Australian Defence Force
AEMF	Aircraft Equipment Maintenance Flight
AER	Additional Estimates Review
AFHR	Airframe Flying Hours
AFLOG	Air Force Logistics
AFOR	Air Force Operational Requirement
AFP-DIS	Air Force Plans - Disposition
AFPEAG	Air Force Programmes and Estimates Analysis Group
AFPEC	Air Force Programmes and Estimates Committee
AFRC	Air Force Requirements Committee
AFSO	(1) Air Force Staff Objective (2) Air Force Supply Officer
AFSR	Air Force Staff Requirement
AFSREP	Air Force Supply Representative
AFST	Air Force Staff Target
AFTD	Air Force Technical Directive
AFTI	Air Force Temporary Instructions
AI	Application Identifier
AIN	Approved Item Name
AIU	Articles-in-use
ALCS	Army Load Coordination Staff
AMF	Aircraft Maintenance Flight
AMP	Annual Maintenance Programme
AMPQ	Annual Maintenance Programme Quantity
AMPQ	Annual Maintenance Programme Quantity
AMS	Air Movements Section
AMTDU	Air Movements and Trials Development Unit
AN	Non-preferred Alternative
ANI	Add New Item
AOC	Air Officer Commanding
AOCSC	Air Officer Commanding Support Command
AOG	Aircraft Operationally Grounded
AP	Preferred Alternative
APU	Auxiliary Power Units
AQ	Assessed Quantity
AQ/PQ	Assessed Quantity/Provisioning Quantity
ARDU	Air Force Research and Development Unit
ARL	Aeronautical Research Laboratories
ASC	Administrative Support Cell

ASCC	Air Standardisation Co-ordinating Committee
ASD	Australian Secret Document
ASDBC	AS, Development and Budget Control
ASQAERP	AS, Quality Assurance and Engineering Resources Policy
ASQATSS	AS Quality Assurance Technical Services and Standards
ASRP-AF	AS, Resources Planning - Air Force
ASSA	Priority Inability Asset Report
ASSI	Inability Asset Report
ASUG	Air Support User Group
ATE	Automatic Test Equipment
AUSDIP	Australian Services Standards Demand and Issue Procedure
AUSMIMPS	Australian Standard Materiel Issue and Movement Priority Systems
AUST IIG	Australian Item Identification Guide
AUTOCOP	Automated Co-operative Logistics
AUTODIN	Automatic Digital Network
AUTOLOG	Automated Logistics System
AUTOPROC	Automated Procurement System
Aet	Item Set Availability Target
Ait	Item Availability Target
BCC	Base Calibration Centre
BEQ	Base Entitlement Quantity
BSDAR	Base Squadron Darwin
CAC	Commonwealth Aircraft Corporation
CAFM	Chief of Air Force Materiel
CAFOP	Chief of Air Force Operations and Plans
CAFP	Chief of Air Force Personnel
CAFTS	Chief of Air Force Technical Services
CAMM	Computer Aided Maintenance Management
CAPO	Contract Acceptance and Purchase Order
CAPPROJD	Capital Projects Division
CAS	Chief of the Air Staff
CASAC	Chief of the Air Staff Advisory Committee
CC	Control Period
CCR	Catalogue Change Report
CDF	Chief of the Defence Force
CENCAT3	Defence Cataloguing System
CEO(BE)	Chief Executive Officer (Budget and Estimates)
CEORPA-AF	CEO, Resources Planning Activities - Air Force
CEOSUPP	CEO, Supply
CERPAS	Controller, External Relations, Projects & Analytical Studies
CFU	Carried Forward Unserviceabilities
CHRS	Component History Recording System
CL	Accounting Classification
CLI	Critical Logistic Item
CLIC	Critical Logistic Item Committee
CLKEA	Clerk Equipment Administration
CLKSPLY	Clerk Supply
CLOG	Chief of Logistics
CLSSA	Co-operative Logistics Supply Support Arrangement
CMO	Critical Maintenance Operations
CMP	Configuration Management Plan
CMPC	Configuration Management Policy Co-ordinator
CMR	Calculated Minimum Requirement

CMWG	Configuration Management Working Group
CO	Commanding Officer
COORDAIR	Coordinator Air
COORDSUR	Coordinator Surface
CP	Consumption Period
CPAS	Controller, Projects & Analytical Studies (now CERPAS)
CPI	Consumer Price Index
CPU	Central Processing Unit
CS&S	Chief of Supply and Support
CSD	Computer Services Division
CSE	Central Studies Establishment
CSER	Consolidated Scales of Equipment Requirement
CSUP	Chief of Supply
DA	Deployment Allowance
DAASO	US Defense Automatic Addressing System
DAEENG-AF	Director of Aeronautical Equipment Engineering - Air Force
DAFP	Director of Air Force Plans
DAFS	Director of Air Force Safety
DAIRENG-AF	Director of Aircraft Engineering - Air Force
DAP-AF	Director of Aircrew Publications - Air Force
DBM	Data Base Maintenance
DBMS	Data Base Management System
DCA	Defence Cataloguing Authority
DCAS	Deputy Chief of the Air Staff
DCATSERV-AF	Directorate of Catering and Services - Air Force
DCCS	Defence Code for Contractors or Suppliers
DCMRS1-AF	Design and Configuration Management Review Staff 1
DCO	Duty Carried Out
DCS	Defence Cataloguing System
DCSSM	Directorate of Computerised Supply Systems Management
DD	Desired Distribution
DDCA	Director, Defence Cataloguing Authority
DDGSUP-AF	Deputy Director General, Supply - Air Force
DDS	Department of Defence Support
DDTS-AF	Director, Defence Technical Staff - Air Force
DECOR	Depot and Intermediate Level Control and Reporting
DEFAIR	Department of Defence Air Force Office
DEFCOMNET	Defence Communications Network
DELPD	Report of Progress against PD
DEPSECB	Deputy Secretary B
DESDIST	Desired Distribution
DEVMS	Development of Management Systems
DF	(1) Distribution Factor (2) Deration Factor
DFAC	Delayed Facilities
DFDC	Defence Force Development Committee
DGAIRENG-AF	Director General, Aircraft Engineering - Air Force
DGMATD-AF	Director General, Materiel Definition - Air Force
DGMATP-AF	Director General, Materiel Projects - Air Force
DGMOVT	Director General, Movements and Transport
DGOR-AF	Director General, Operational Requirements - Air Force
DGQA-AF	Director General Quality Assurance - Air Force
DGSUP-AF	Director General Supply - Air Force
DGTP-AF	Director General Technical Plans - Air Force
DH&C	Department of Housing and Construction
DIC	(1) Defence Industry Committee

(2) Document Identifier Code

DIL	Defence Identification List
DINV	Delayed Investigation
DIR	Defect Investigation Report
DIRM-AF	Director Inventory Resource Management - Air Force
DIVR	Delayed Issue Voucher Report
DJOPS-AF	Director of Joint Operations, Plans - Air Force
DL	Depot Level Maintenance
DLM	Depot Level Maintenance
DMAN	Delayed Manpower
DMAPO	Director of Maritime Aircraft Projects
DMO	Draft Modification Orders
DMOP	Director of Maintenance Operations Policy
DMOVT-AF	Directorate of Movements and Transport - Air Force
DMP-AF	Director of Maintenance Policy - Air Force
DNCO	Duty Not Carried Out
DOD	Department of Defense (US)
DOLGAS	Department of Local Government and Administrative Services
DOPS-AF	Director of Operations - Air Force
DORC	Defence Operational Requirements Committee
DPCO	Duty Partially Carried Out
DPMA-AF	Director of Project Management and Acquisition - Air Force
DPO	Defence Purchasing Organisation
DPPAC-AF	Director of Project Programming Analysis and Coordination - Air Force
DPPROV-AF	Directorate of Project Provisioning - Air Force
DPPUR-AF	Directorate of Project Purchasing - Air Force
DPTS	Delayed Parts
DQA	Directorate of Quality Assurance
DQAS	Directorate of Quality Assurance Support
DRB6	Defence Functional Directory
DRMP-AF	Director of Resources Monitoring and Planning - Air Force
DRQF	Daily Items in Quarantine Account F
DRS	Data Recording Section
DRSSC	Deputy Regional Secretary Support Command
DSC-AF	Directorate of Supply Computing - Air Force
DSED	Director of Supply EDP Development
DSFP-AF	Director of Supply Financial Programming - Air Force
DSMR-AF	Director of Supply Management Research - Air Force
DSPOL-AF	Directorate of Supply Policy and Systems Development - Air Force
DSRMS	Defence Supply Retail Mini-Computer System
DSS	Decision Support System
DSSG	Defence Standardisation Studies Group
DSTO	Defence Science and Technology Organisation
DTDA	Delayed Technical Data
DTELENG-AF	Director, Telecommunications Engineering - Air Force
DTFPO	Director Tactical Fighter Project Office
DTP-AF	Director of Technical Plans - Air Force
DWEAPENG-AF	Director, Weapons Engineering - Air Force
ECP	Engineering Change Proposals
EDD	Expected Date of Delivery
EDP	Electronic Data Processing
EF	Effort

EI	Effort Indicator
ELO	Equipment Liaison Officer
EOQ	Economic Order Quantity
ERA	Estimated Repair Arisings
ERG	Engineering Requirements Ground
ESA	Equipment Survey Account
ESI	Equipment Staff Instruction
ESOLOG	Executive Staff Officer, Logistics Planning Performance Monitoring
ESOSPT	Executive Support Officer, Administrative and Support Services
FAD	Force Activity Designation
FASDF	First Assistant Secretary, Defence Facilities
FASFDA	First Assistant Secretary, Force Development and Analysis
FASFIN	First Assistant Secretary, Financial Services and Internal Audit
FASPB	First Assistant Secretary, Programs and Budgets
FASTSLD	First Assistant Secretary, Technical Services and Logistic Development
FCAS	Financial Control and Analysis Section
FDA	Force Development and Analysis
FDC	Financial Delegates Certificate
FE	Force Elements
FEG	Force Element Groups
FHC	Flying Hour Conference
FIIG	Federal Item Identification Guide
FINEST	Financial Estimation
FINSERVMAN	Financial Services Manual
FLT	Forklift Trucks
FMAJR	Major Circuit
FMINR	Minor Circuit
FMS	Foreign Military Sales
FORP	Forward Ordering Review Period
FRA	Forecast Repair Arisings
FRS	Failure Reporting System
FTR	Forecast Total Removals
FY	Fiscal Year or Financial Year
FYDP	Five Year Defence Programme
FYRP	Five Year Rolling Programme
GAF	Government Aircraft Factory
GEN	General
GSE	Ground Support Equipment
GTC	Gas Turbine Compressors
GTE	Ground Telecommunications Equipment
HAMP	Hastening Action Minimum Period
HMMRS(RAAF)	Head Defence Technical Staff - Air Force
HQOC	Headquarters Operational Command
HQSC	Headquarters Support Command
IAR	Inability Asset Report
ICL	Inventory Control Levels
IEEE	Institute of Electronic and Electrical Engineers
IIN	Item Identification Number
ILM	Intermediate Level Maintenance
IML	Identification and Management List
INS	Installed
IPB	Illustrated Parts Breakdown

IPR	Interim Provisioning Review
IPRP	Interim Provisioning Review Progression Report
ISAC	Information Systems Work and Analysis of Change
ITR	Invitation to Register Interest
JEPS	Joint Exercise Planning Staff
JI	Job Inventory
JIC	Job Inventory C
JO	Job Order
JOBC	Job Change
JOBT	Job Termination
JORMS	Job Order Recording and Management System
LBRI	Logistics Branch Routine Instruction
LCC	Life Cycle Cost
LEN	LOAS Entry Number
LMC	Local Modification Committee
LMI	Logistics Management Institute
LMIS	Logistics Management Information System
LOA	Letter of Offer and Acceptance
LOAS	List of Assessed Spares
LORAM	Level of Repair for Aeronautical Material
LOT	Life of Type
LPR	Limited Procurement Requirement
LPSD	Local Purchase Stores Depot
LPUN	Local Purchase Unit
LR	Local Receipt
LRU	Line Replaceable Units
LSCG-RAAF	RAAF Logistics Study Control Group
LT	Lead Time
MA	Maintenance Allowance
MAARS	Maintenance Analysis and Reporting System
MAC	Military Airlift Command
MAJMF	Major Circuit Maintenance Factor
MAN	Manual
MASB	Management Advisory Services Branch
MATU	Mobile Air Terminal Unit
MAXFIT	Maximum Fit
MAXSP	Maximum Supply Period
MC	Manufacturer's Code
MCO	Movement Control Offices
MCRL	Master Cross Reference List
MCS	Maintenance Control Section
MD	Management Decision
MDT	Mean Maintenance Down Time
ME	Measuring Equipment
MEA	Major Equipment Acquisition
MEP	Major Equipment Proposal
MHE	Materials Handling Equipment
MI	MMI Replacement
MIC	Management Information Centre
MIHR	Monthly Inability Hastener Report
MILC	MMI Location Change
MILOGP	MMI Log Permanent
MILSTRIP	Military Standard Requisition and Issue Procedures
MIMI	MMI Maintenance Input
MIMS	Movement Information Management System
MINSP	Minimum Supply Period
MIOP	MMI Operations

MIPACS	Movements Information Passenger and Cargo System
MIRE	MMI Reception
MMC	Maintenance Management Committee
MMI	Maintenance Managed Items
MMR	Monthly Maintenance Report
MMRS	Maintenance Management Review Staff
MNTAL	Maintenance Alert
MNTFOR	Maintenance Forecast
MNTWS	Maintenance Worksheet
MOD	Modification Orders
MODA	Modification Status Change - Aircraft
MODM	Modification Status Change - MMI
MODORD	Modification Order Report
MODPROG	Modification Progress Report
MODSTAT	Modification Status Report
MODSUM	Modification Status Summary Report
MONSUM	Monthly Summary
MOVCORDC	Movement Coordination Centre
MOVDEC	Movement Decision
MOVDIV	Movement Diversion
MOVREQ	Movement Request
MP	Maintenance Policy
MPAC	Maintenance Policy Aircraft
MPMI	Maintenance Policy MMI
MPQ	Maximum Provisioning Quantity
MR	(1) Master Record (2) Major Rectification
MRCC	Melbourne Regional Computer Centre
MRI	Master Record Index
MRN	Manufacturer's Reference Number
MRRS	Modification Recording and Reporting System
MS	Measurement Standards
MSDM	Maintenance Managed Items Due-In from Maintenance
MSI	Maintenance Supply Item
MSSR	Maintenance Supply Status Report
MT	Motor Transport
MTBF	Mean Time Between Failures
MTBM	Mean Time Between Maintenance
MTBR	Mean Time Between Repair
MTS	Motor Transport Section
MTTR	Mean Time To Repair
MUE	MSI Unit Entitlement
NA	New Authorisation
NABU	Not Assessed Buy on Usage
NAS	Not Assessed as a Spare
NATO	North Atlantic Treaty Organisation
NC	Nation Code
NCB	National Codification Bureau
NCO	(1) Non-Commissioned Officer (2) Navy Coordination Officer
NCS	NATO Codification System
NDI	Non-Destructive Inspections
NDISL	NDI Standards Laboratory
NIIN	NATO Item Identification Number
NOPER	Number of Items Fitted Per Aircraft
NOST	No Status
NSC	NATO Supply Class

NSG	NATO Supply Group
NSN	NATO Stock Number
OARSM	Organisation Analysis and Requirements Specification Methodology
OC	Officer Commanding
OCS	Outward Consignment Sheet
ODC	Overdue Deliveries from Contractors
ODOR	Outstanding Draft Overseas Receipt Voucher Report
ODP	Office of Defence Production
OI	Overseas Indent
OLAE	On-Line Aircraft Establishment
OLM	Operating Level Maintenance
OLN	Outward Loan Accounts
OMD	Outstanding Management Decision
OO	Overseas Order
OPNAVINST	Operational Naval Instructions
OR	Overseas Receipt
OSD	Outstanding Deliveries
OSO	Outstanding Obligations
OSS	Organisational Support System
PAQ	Provisioning Action Quantity
PATTRIC	Poisson Availability Target Technique for Repairable Item Computation
PC	Provisioning Category
PCM	Production Control Meeting
PCO	Planned Carry Over
PCSP	Production Control/Status Proforma
PCSR	Production Control Status Requirement
PD	(1) Procurement Demand (2) Priority Designator
PE	Parent Equipment
PERCAPREP	Performance and Capability Report
PG	Priority Group
PI	Priority Index
PIAR	Priority Inability Asset Report
PLR	Print Local Receipt
PLT	Provisioning Lead Time
PMC	Principal Modification Coordinator
PO	Purchase Order
POF	Power on Factor
POL	Priority Output List
POM	Maintenance Order
POR	Print Overseas Receipt
PP	Proposed Purchase
PPOLOGSUP	Programming and Provisioning Officer
PRF	Percentage Replacement Factor
PRI	Potentially Repairable Item
PROCAT	Provisioning Category
PROVMON	Provisioning Review Monitoring System
PRS	Performance Reporting System
QAA	Quality Assurance Authority
QAOLOG	DQA-AF Technical Officer
QASC	Quality Assurance Sub-Committee
QAV	Question Answer Validation
QIFC	Quarterly Issue Frequency Current
QMAJP	Major Circuit Pipeline Quantities
QMINP	Minor Circuit Pipeline Quantities

QNUC	Quarterly Normal Usage Current
QOR	Quarterly Output Requirement
QPL	Total Circuit Pipeline Quantities
QSD	Quantity Stores Depot
QTNF	Quarantine Account F
RAAF	Royal Australian Air Force
RAAFSUP	RAAF Supply Central
RAC	Requirements Amplification Code
RAF	Royal Air Force
RAMP	RAAF Analytical Maintenance Programme
RAN	Royal Australian Navy
RCA	Record Change Advice
REP	Repairable
REPSTK	Repairable Stock
RESENG	Resident Engineer
REVR	Provisioning Review Request
RFOC	Request For Order Change
RFQ	Request for Quotation
RFT	Request for Tender
RGP	Report Generating Package
RI	Repairable Items
RIM	Repairable Item Management
RLA	Repair Level Analysis
RLS	Repair Loan Stores
RNCC	Reference Number Category Code
RNVC	Reference Number Variation Code
RNZAF	Royal New Zealand Air Force
RO	Repair and Overhaul
ROADMOV	Road Movement
ROE	Rate of Effort
ROTR	Receipt Out of Target Report
RPB	RAAF Planning Base
RPO	Regional Purchasing Officer
RRS	RAAF Reference Standards
RS	Special Service
RSDS	RAAF Supply Depot System
RUE	Rounded Unit Entitlement
Rn	Routine Service
SA	(1) Stores Adjustment Voucher (2) Serviceable - Absent on Task
SADT	Structured Analysis and Design Technique
SAS	Superintendent Analytical Studies
SAU	Self Accounting Unit
SB	Statistical Bulletin
SCN	Scale Change Notification
SD	Superseded
SDD	Standard Delivery Date
SDTS	Scheduled Downtime
SEOLOGEM	Senior Executive Officer, Engineering and Maintenance
SEOLOGSUP	Senior Executive Officer, Supply
SERLEV	Servicing Level
SESO	Senior Equipment Staff Officer
SF	Fully Serviceable
SG	Support Group
SHCR	Scaled Holdings Comparison Peport
SHR	Scaled Holdings Report
SI	Scaled Items

SIGLOG	Significant Logistics Problem
SIGMA	Services Inventory Gamma-based Management
SIP	Strategic and International Policy
SL	Storage Life
SLENGO	Senior Logistics Engineering Officer
SLOC	Stock Location
SLSPTO	Senior Logistics Support Officer
SLV	Stock Location Verification
SM	Supply Margin
SN	(1) Serial Number (2) Serviceable Not Required
SO	Supply Order
SOA	Statement of Objectives and Activities
SOAEENG	Staff Officer, Aeronautical Equipment Engineering Division
SOAIRENG	Staff Officer, Aeronautical Engineering Division
SOAMS	Staff Officer, Aircraft Maintenance Supply
SOAP	Spectrometric Oil Analysis Procedures
SOCM	Staff Officer, Command Maintenance
SODEVMS	Staff Officer, Management Systems Development
SOE	Staff Officer, Equipment
SOENGS	Staff Officer, Engineering Services Section
SOEXPLENG	Staff Officer, Explosives Engineering Division
SOO	Special Order Only
SOOPS	Staff Officer Operations
SOP	Standing Operating Procedures
SOPROJ	Staff Officer, Projects
SORO	Staff Officer, Repair and Overhaul
SOS	Short of Stock
SOSPTA,B,C&D	Staff Officers Support A, B, C and D
SOSPTSERV	Staff Officer Support Services
SOSQ	Short of Stock Quantity
SOSR	Short of Stock Report
SOTELENG	Staff Officer, Telecommunications Engineering Division
SOWEAPENG	Staff Officer, Weapons Engineering Division
SPEC	Special
SPOL2-AF	Supply Policy 2 - Air Force
SPTO	Support Officer
SR	Serviceable Restricted
SRPO	Senior Reorganisation Project Officer
SSL	Spares Shortages List
SSMAN	Servicing Supply Manual
SSR	System Support Record
SSRP	Supply Systems Redevelopment Project
ST	Serviceable for Test Flight
STI	Special Technical Instruction
STOCKAID	Stock Analysis and Investment Decision
SUE	Scaled Unit Entitlement
SUPCOORD	Supply Co-ordination
SV	Servicing Level
SVC	Serviceable
SVI	Single Vendor Integrity
SVR	Scaling Variation Request
SYSENG	Systems Engineers
TA	Technical Assessment
TALU	Aircraft Loading and Unloading Trucks

TAT	Turn-Around Time
TB	Test Bench Allowance
TBD	Time Between DLM Servicings and Overhauls
TEFFTABAF	Total Effort Table Air Force
TID	Time In Delay
TIR	Total Item Record
TLQ	Total Liability Quantities
TMC	Technical Management Code
TMCSUP	Technical Management Code Supply Item Data Record Cross Reference
TMP	Technical Maintenance Plan
TMS	Time to Make Serviceable
TOR	Terms of Reference
TOS	Order and Ship Time
TSA	Technical Spares Assessor
TSD	Technical Services Division
TSH	Total Spares Holding
TSUB	Technical Susbtitution
TTCP	The Technical Co-operation Programme
TV	Transfer Voucher
UK	United Kingdom
ULM	Unit Level Maintenance
UMO	Unit Maintenance Order
UND	Urgency of Need
UNS	Unserviceable
UPD	Unsatisfied Procurement Demands
US	United States
USAF	United States Air Force
USAFLC	United States Air Force Logistics Command
USN	United States Navy
VA	Valuable and Attractive
VDU	Visual Display Unit
WIP	Work in Progress

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16. Abstract

This Volume is one of a companion set of four comprising CSE Report 27 which records the work carried out by Central Studies Establishment for the Chief of Supply and Support and endorsed by the Chief of the Air Staff. This particular Volume provides an overview of the study, and discusses possible directions for future work.

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